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RAILWAY MACHINERY:

A TREATISE ON THE

MECHANICAL ENGINEERING OF RAILWAYS:

EMBRACING

THE PRINCIPLES AND CONSTRUCTION

OF

ROLLING AND FIXED PLANT;

ILLUSTRATED BY

A SERIES OF PLATES ON A LARGE SCALE, AND BY NUMEROUS ENGRAVINGS ON WOOD.

BY

DANIEL KINNEAR CLARK, C.E.

VOLUME SECOND—PLATES.

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FAIRBAIRN & SONS, MANCHESTER.

THE

ERMINGHAM RAILWAY.

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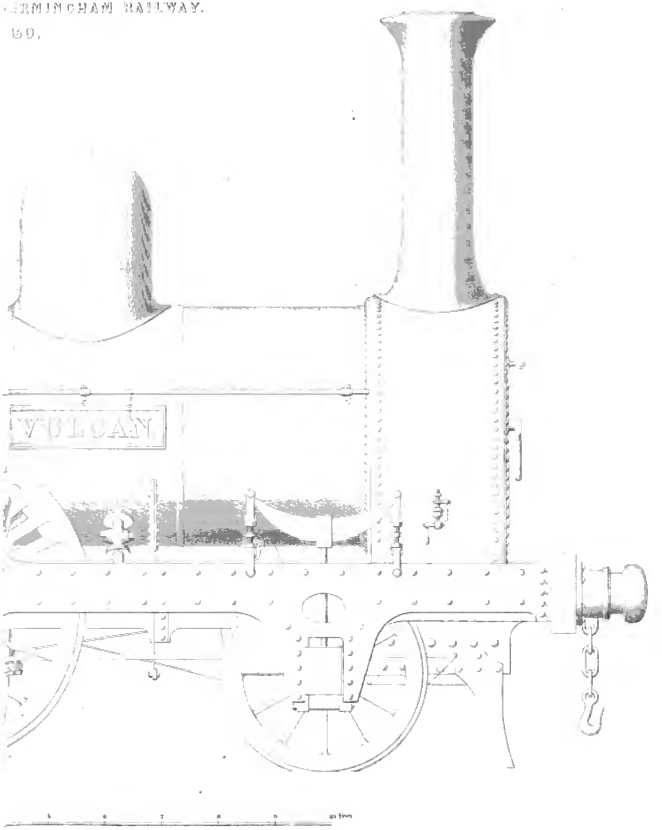

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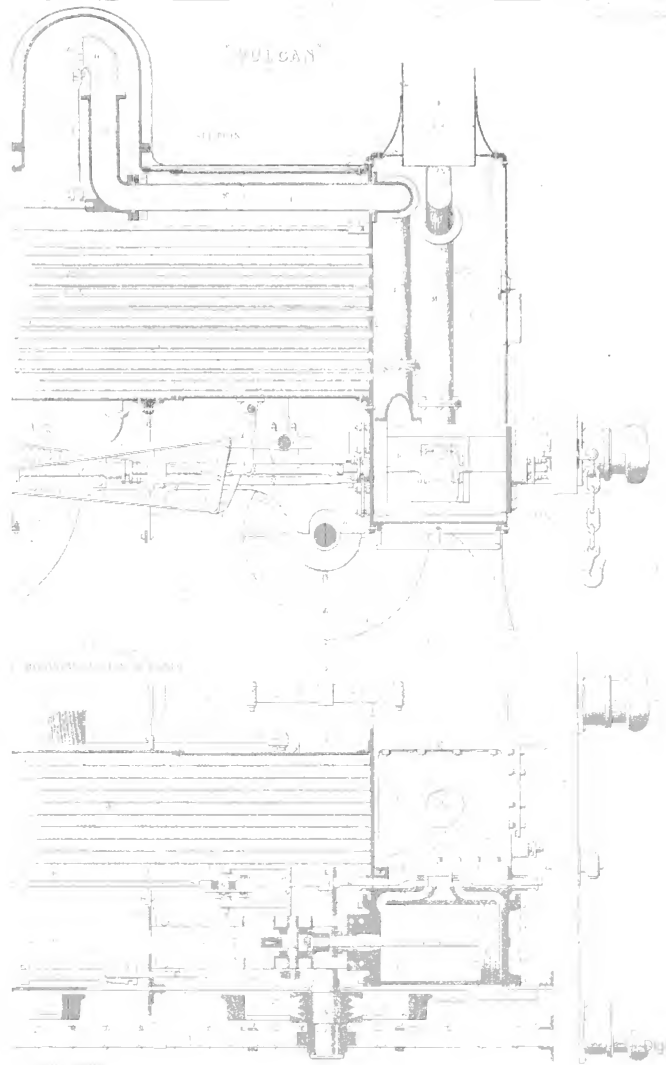

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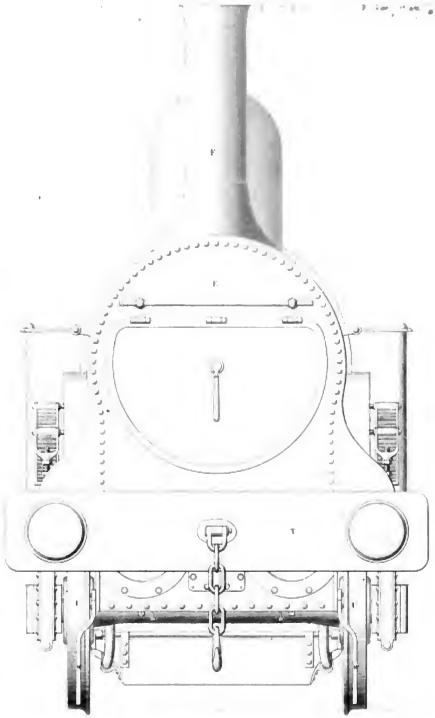
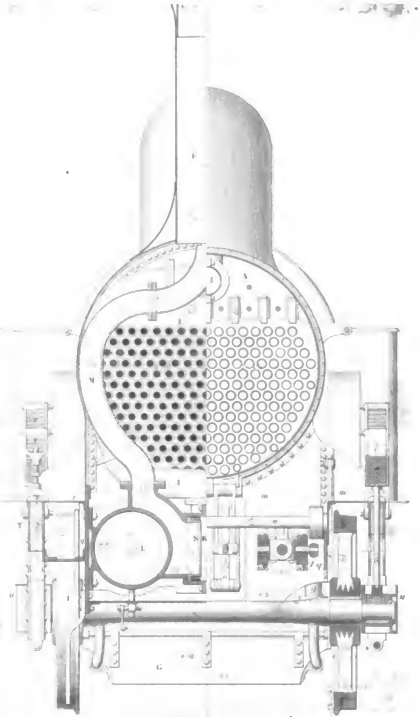


END ELEVATION, AT SMOKE BOX



TRANSVERSE SECTION
THROUGH SMOKE BOX BEHIND SMOKE BOX

Inches 12 9 6 3 0 1 2 3 4 5 6 7 8 9 10 feet

C.E. Clark J.W. Lowe jr.

BLACKIE & SON GLASGOW EDINBURGH & LONDON

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ON, THOMPSON, & HEWITSON, LEEDS.

THE

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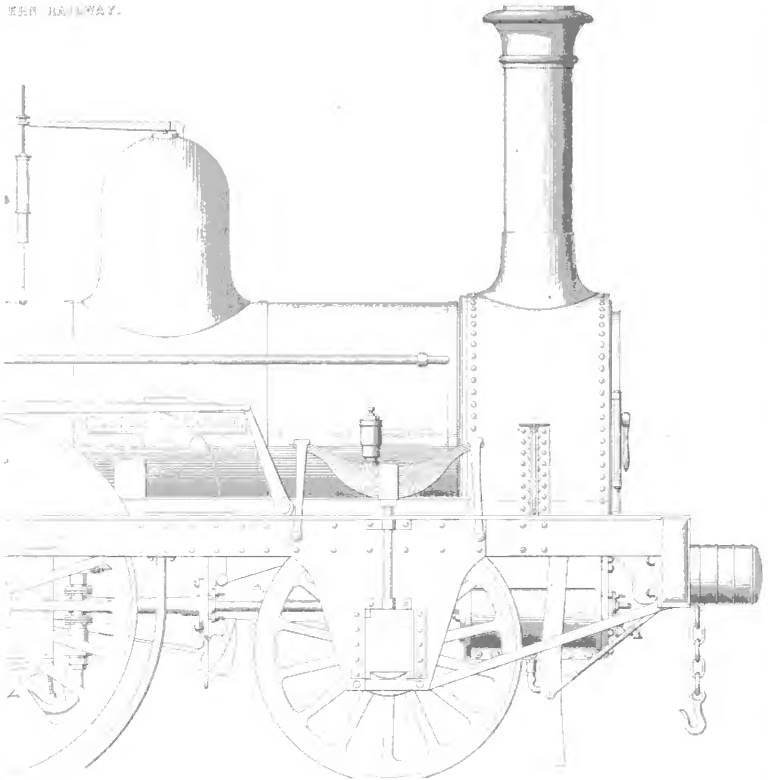

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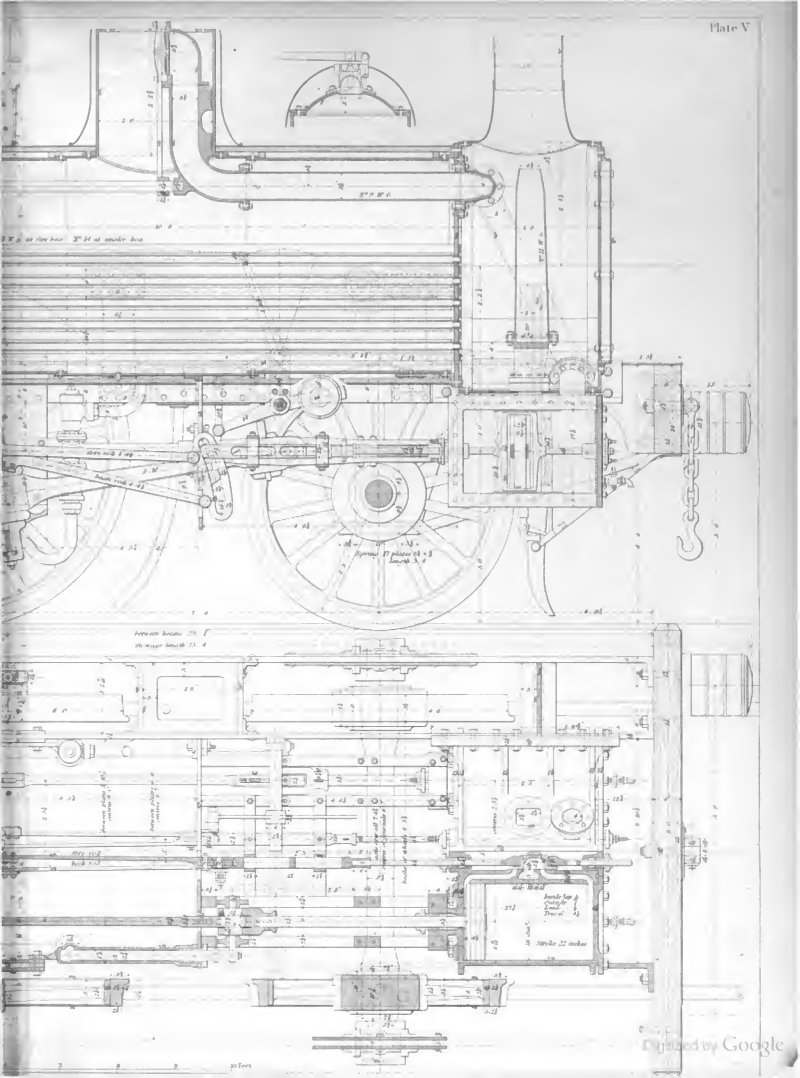

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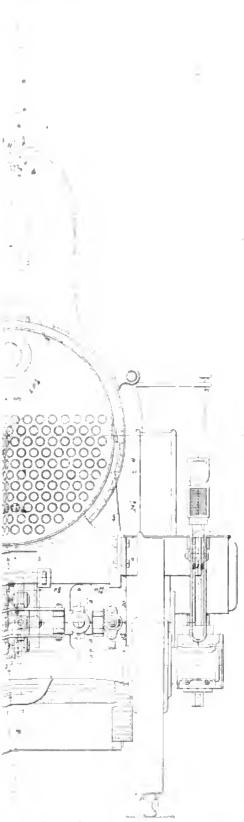
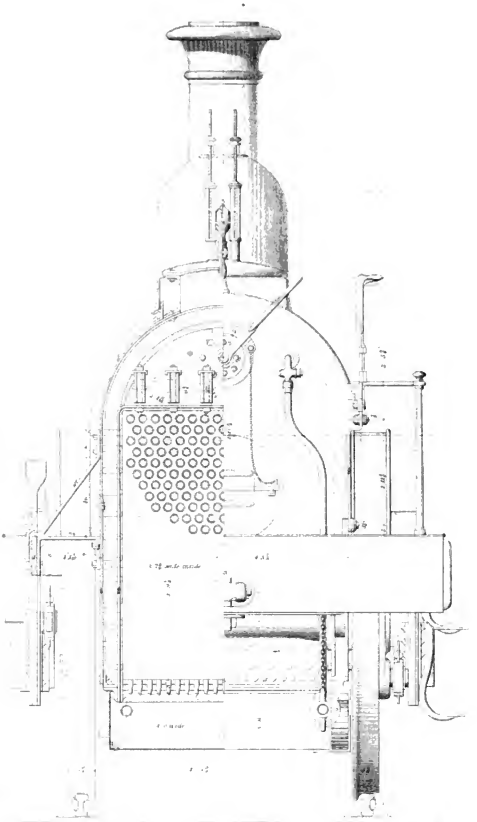


SECTIONS.
STAYS & VALVE GEAR.



FIRE BOX.
TRANSVERSE SECTION END ELEVATION

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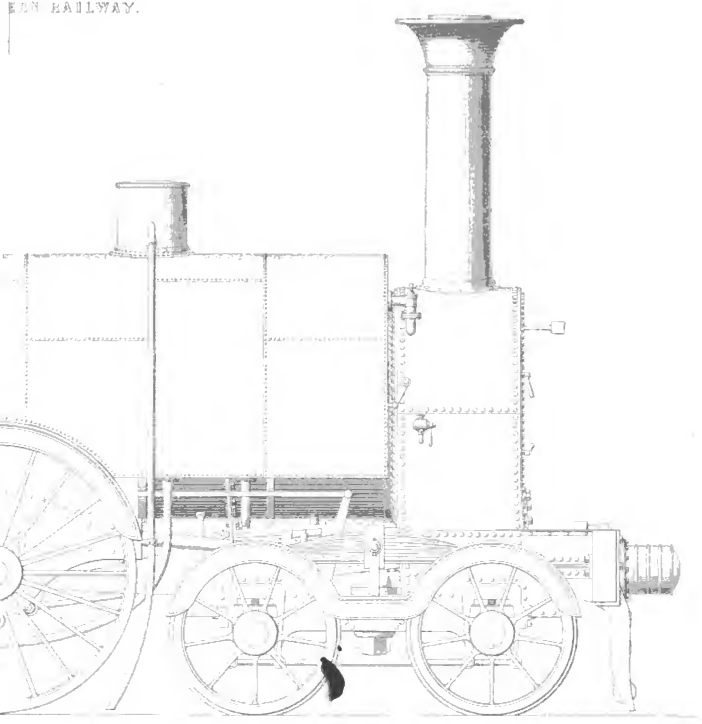

0 1 2 3 10 11 12 Feet

J. W. Lowry, Jr.

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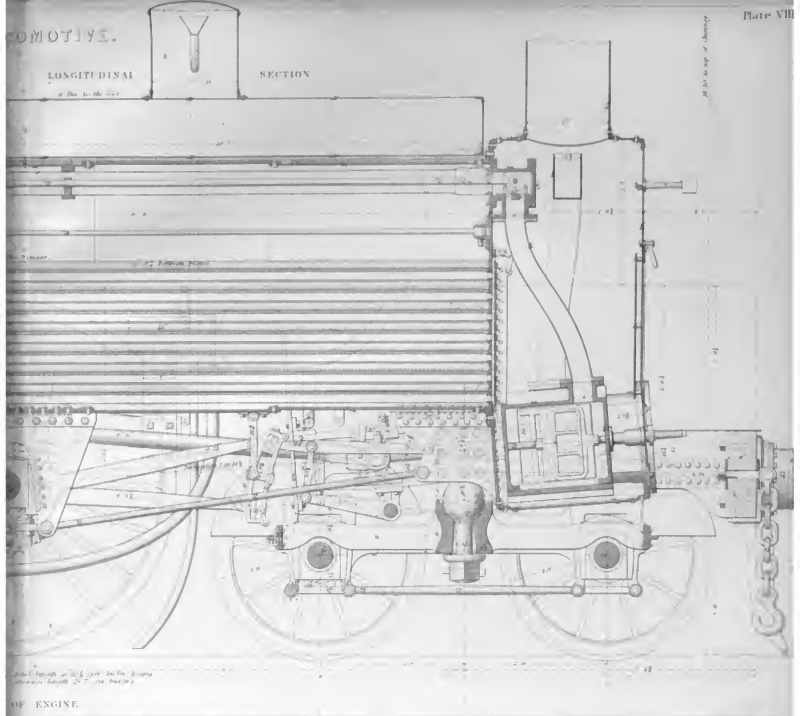
COMOTIVES.

LONGITUDINAL SECTION



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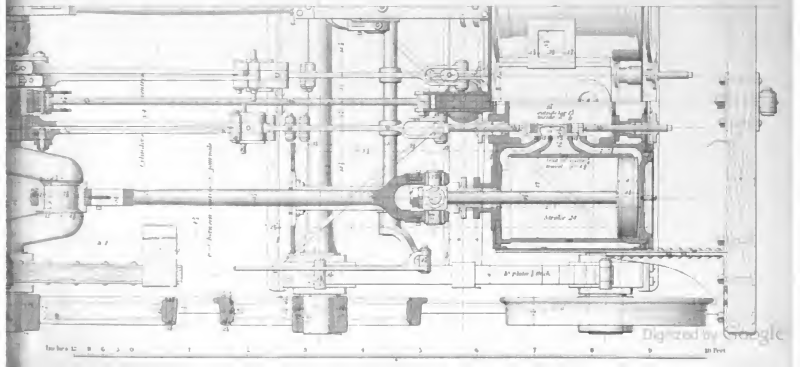

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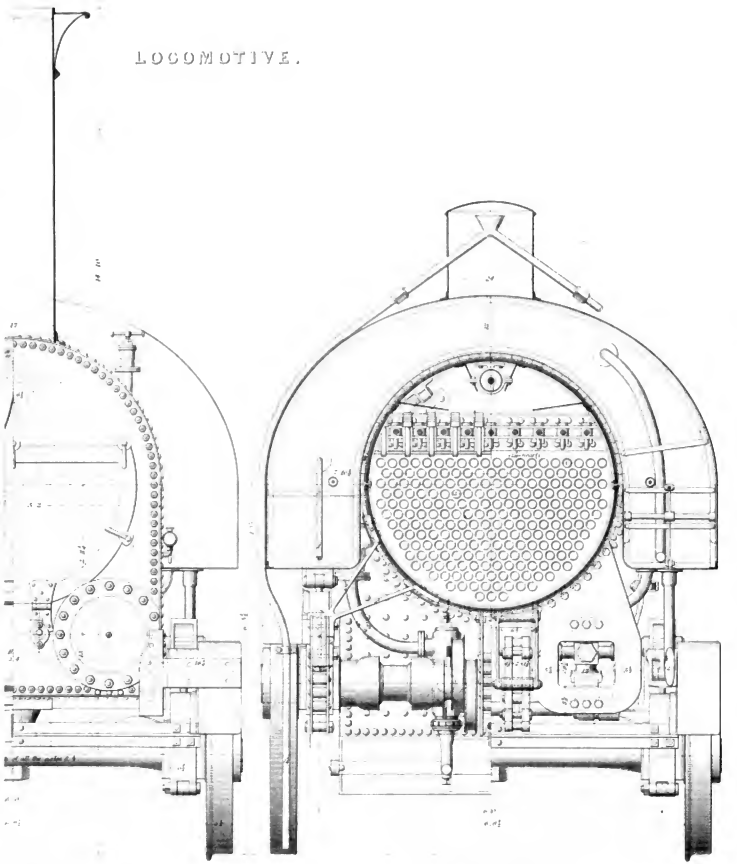

GE BOX
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TRANSVERSE SECTION
IN FRONT OF DRIVING AXLE BEHIND LINK MOTION.

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Engraved by J.H. Lewis

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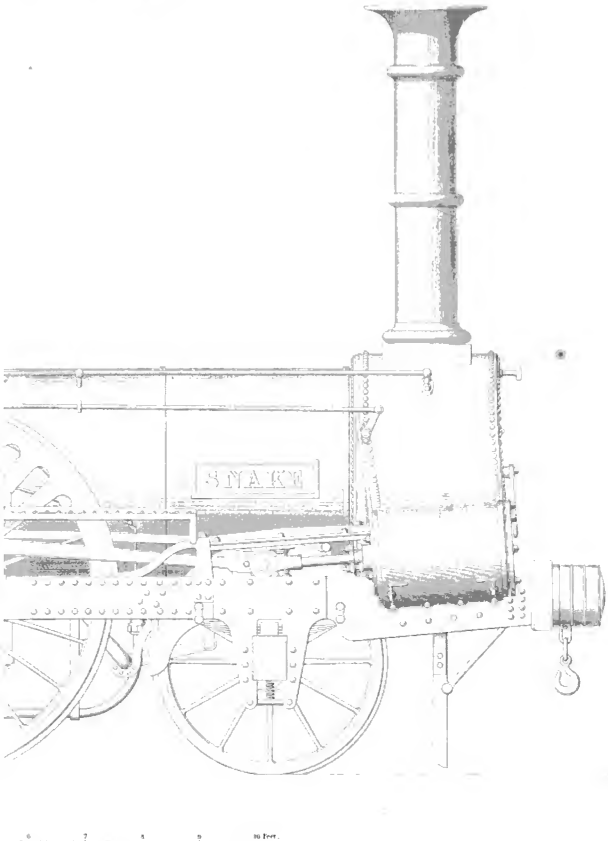
E BY JOHN V. GOOCH,

THE

WESTERN RAILWAY.



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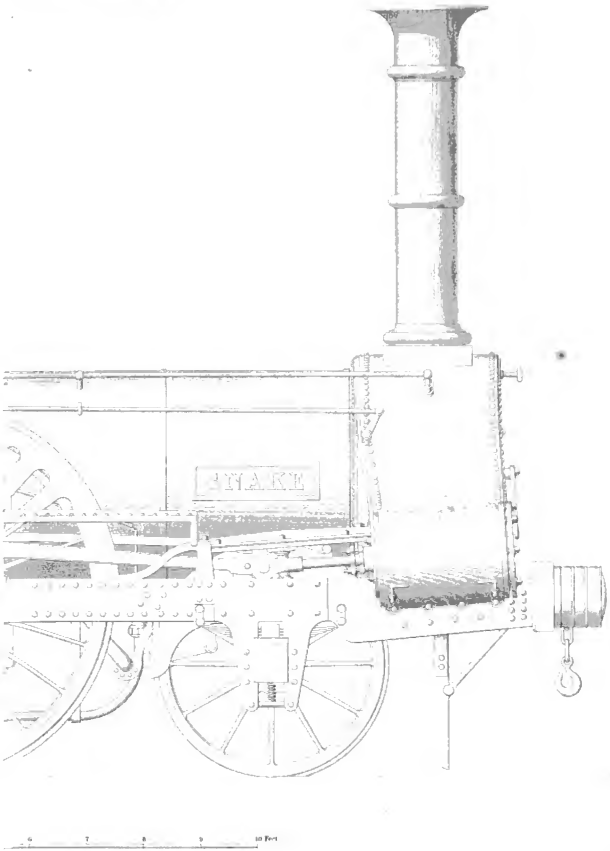

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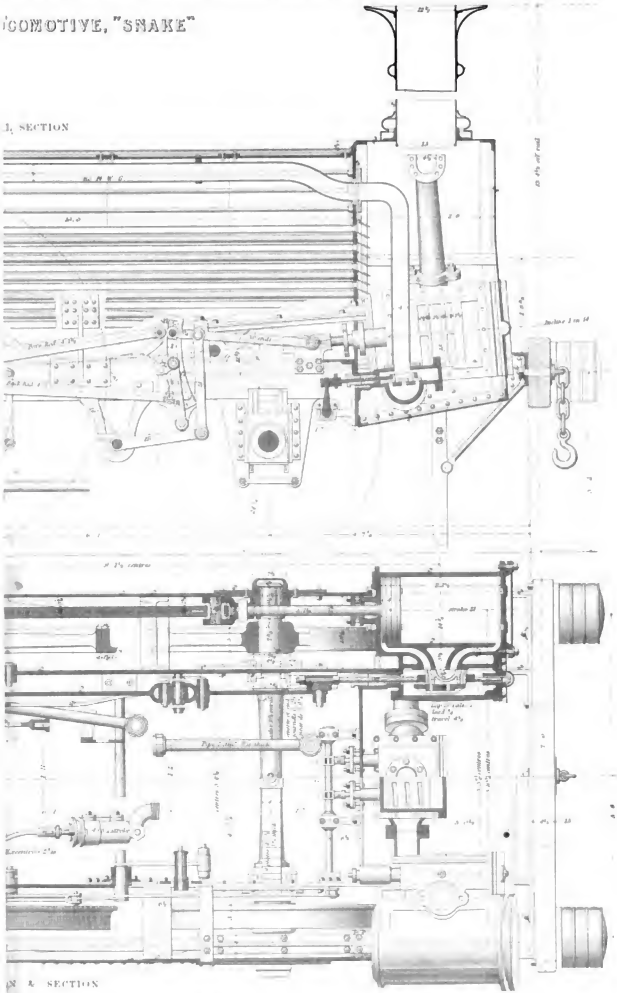
COMOTIVE, "SNAKE"

L, SECTION



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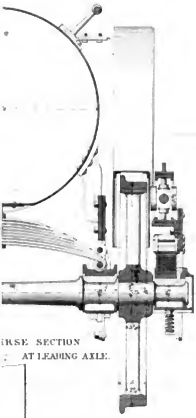
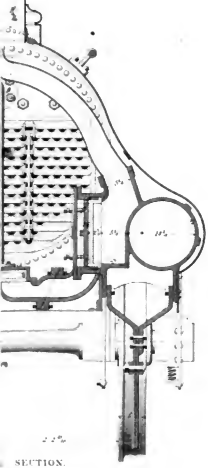
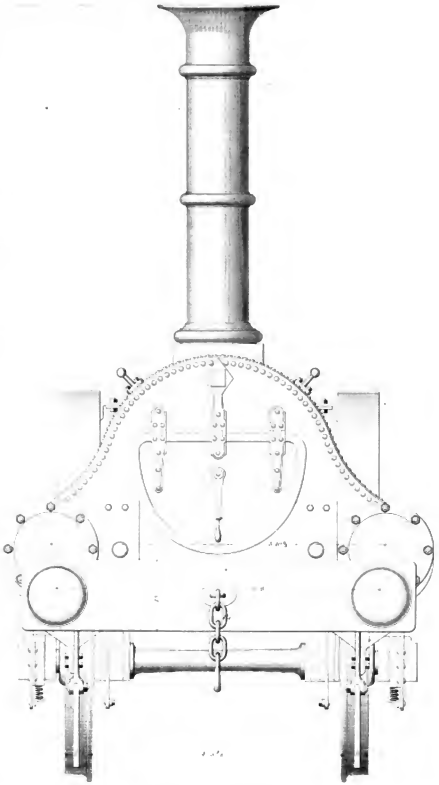


RSE SECTION
AT LEADING AXLE.



SECTION
THROUGH SMOKE BOX.



END ELEVATION AT SMOKE BOX

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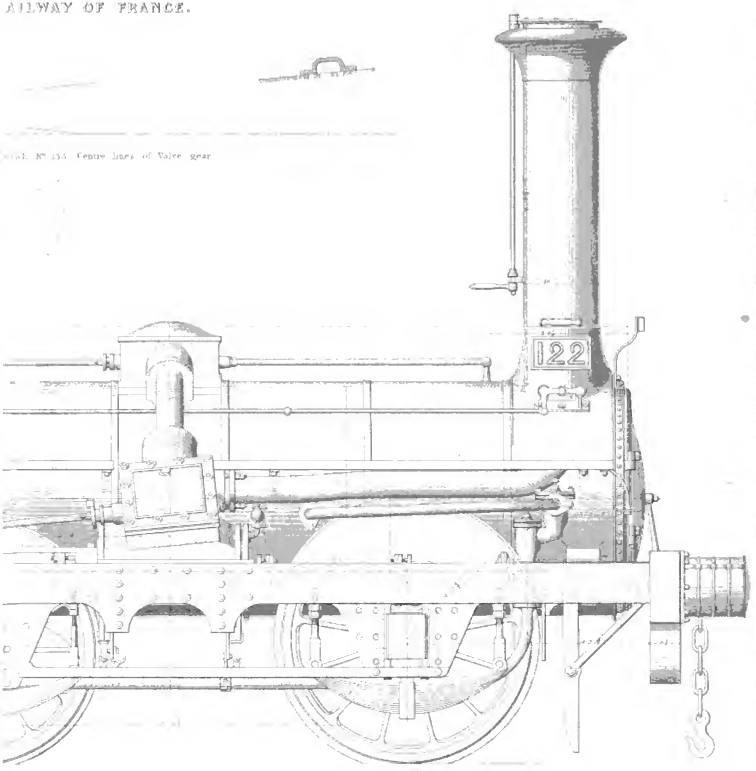
T.R.CRAMPTON'S SYSTEM.

EAIL, PARIS.
AILWAY OF FRANCE.



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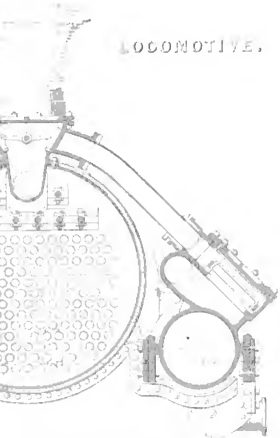
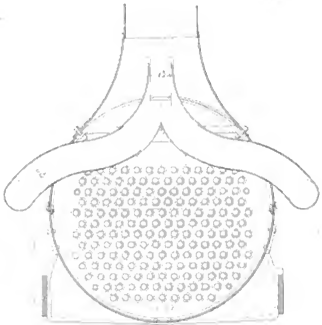
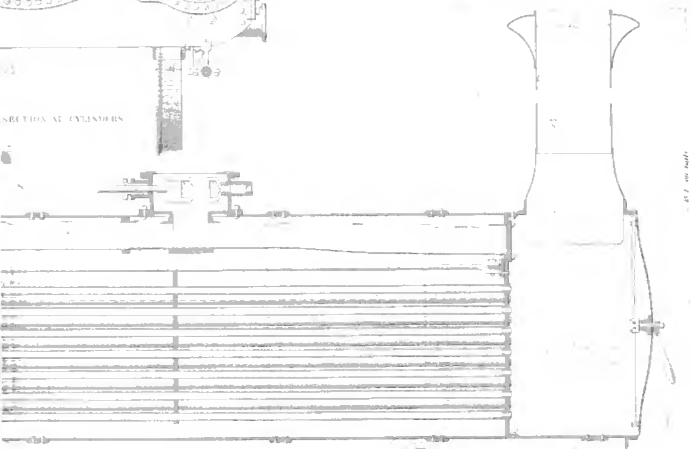




TRANSVERSE SECTION OF SMOKE BOX



SECTION AT CYLINDERS

LONGITUDINAL SECTION

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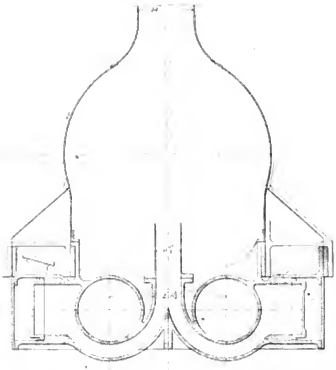
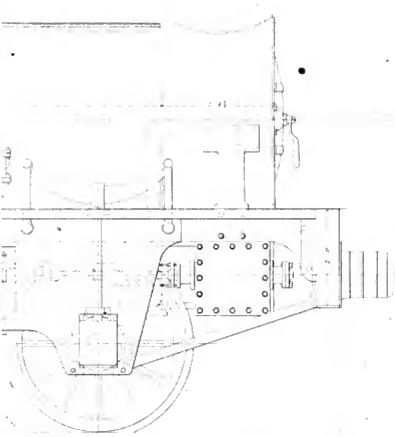
NEWCASTLE ON TYNE.

K. RAILWAY.

SECTION AT SMOKE BOX

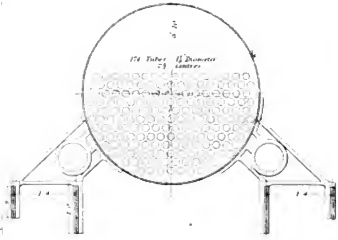


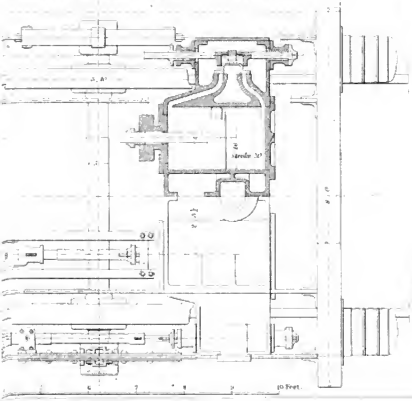


FIRE BOX BRACKET

SECTION OF BOILER

Oval





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...OTIVE ... BY ROBERT STEPHENSON & Co
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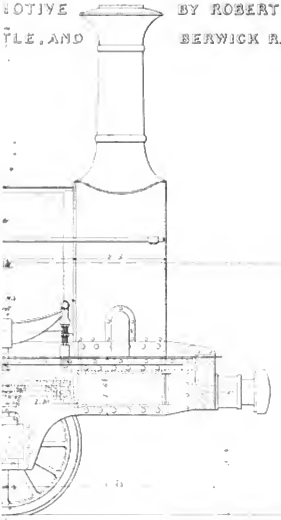

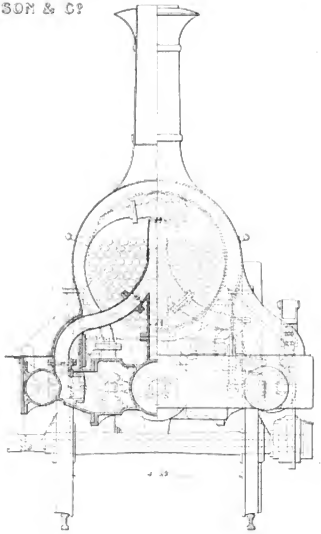

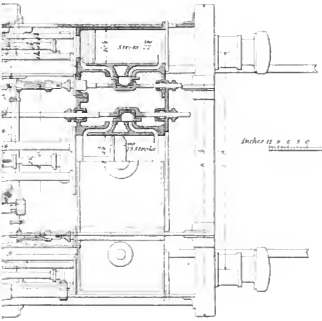

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EALD STURROCK, DONCASTER,
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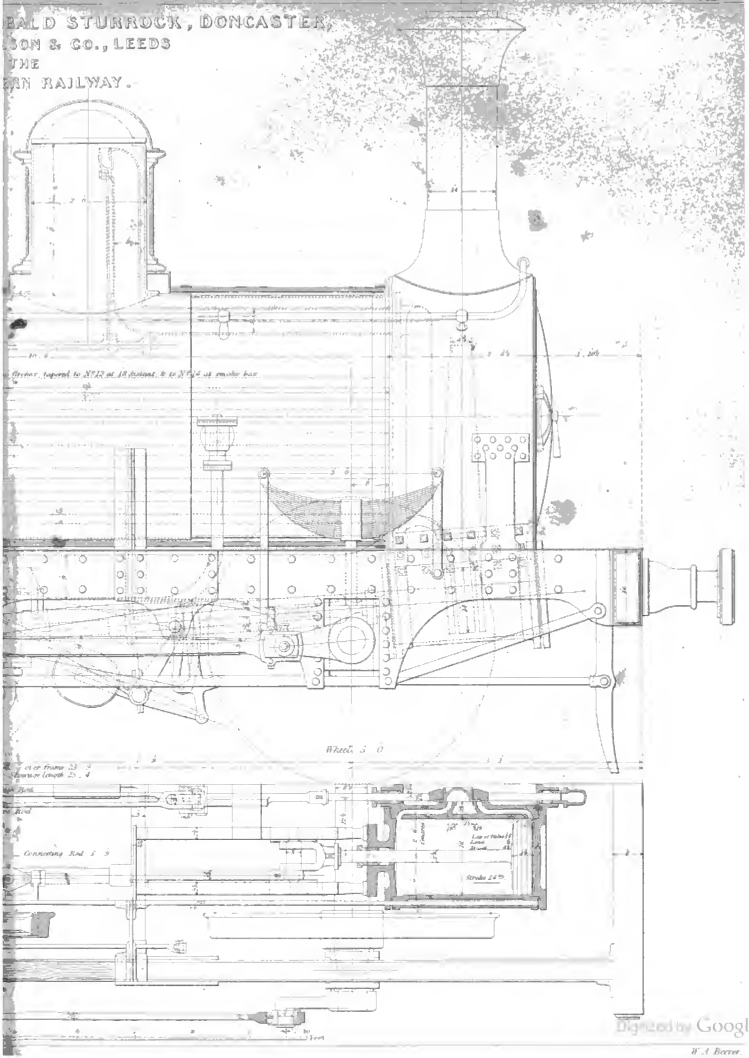

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SHARP BROTHERS & Co

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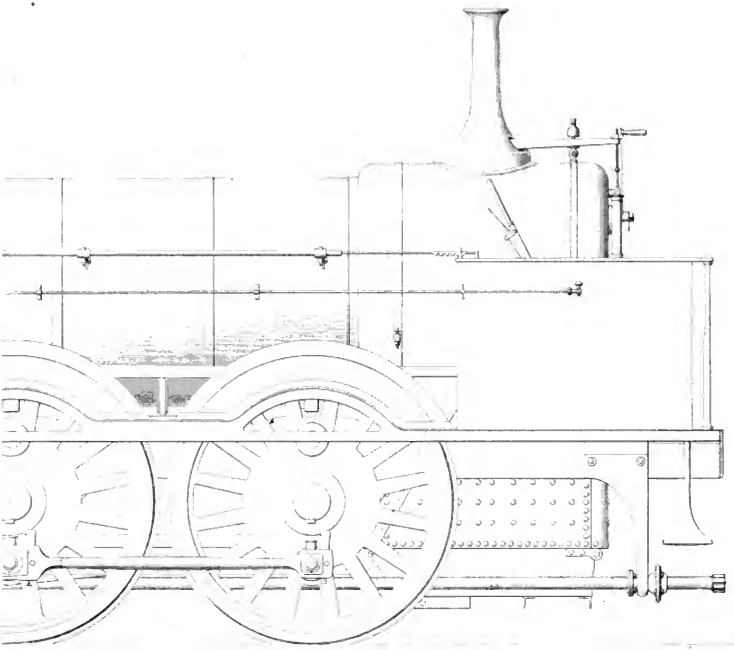
LINCOLNSHIRE RAILWAY, &c.



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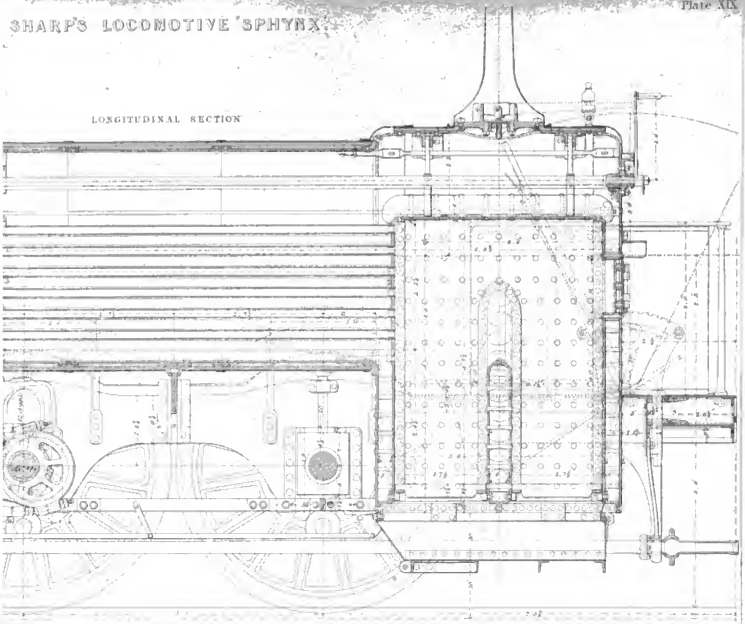
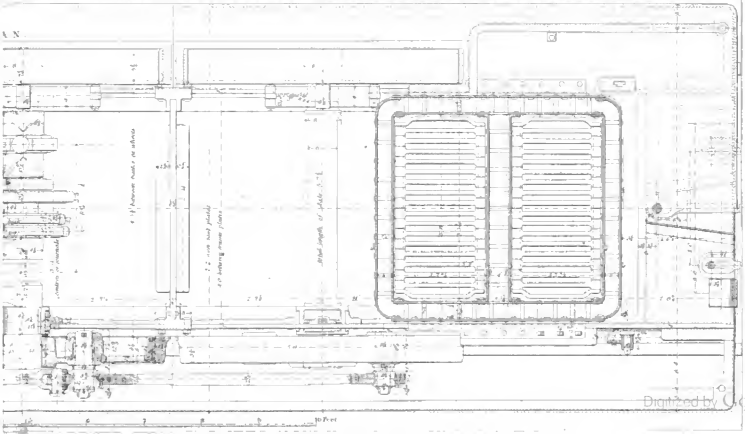
SHARP'S LOCOMOTIVE 'SPHYNX.'

LONGITUDINAL SECTION





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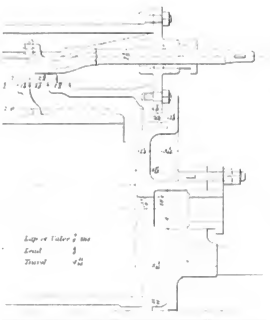
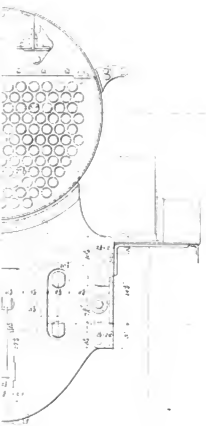
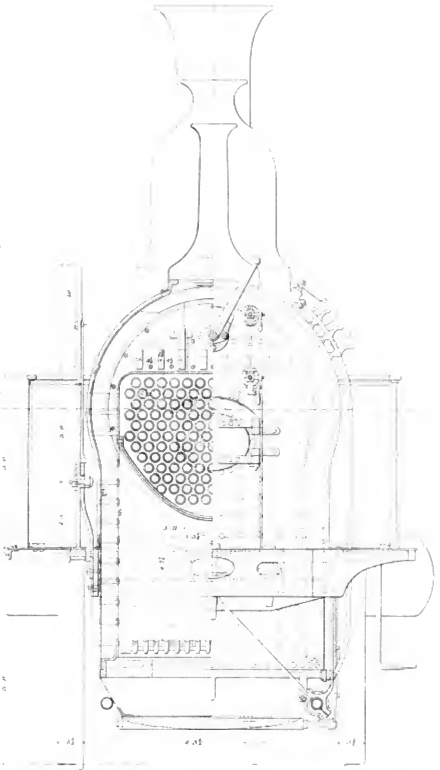
OTIVE 'SPHYNX'.



ALVE-CHEST 1ST FULL SIZE



SECTIONS.
STAYS, & VALVE GEAR.



FIRE + BOX
TRANSVERSE SECTION. END VIEW.

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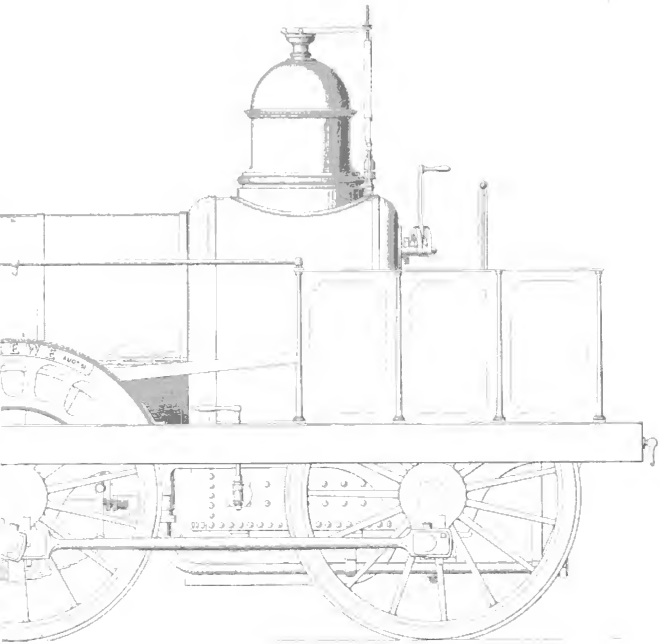
LEXANDER ALLAN, CREWE.

THE

WESTERN RAILWAY.

DIVISION.



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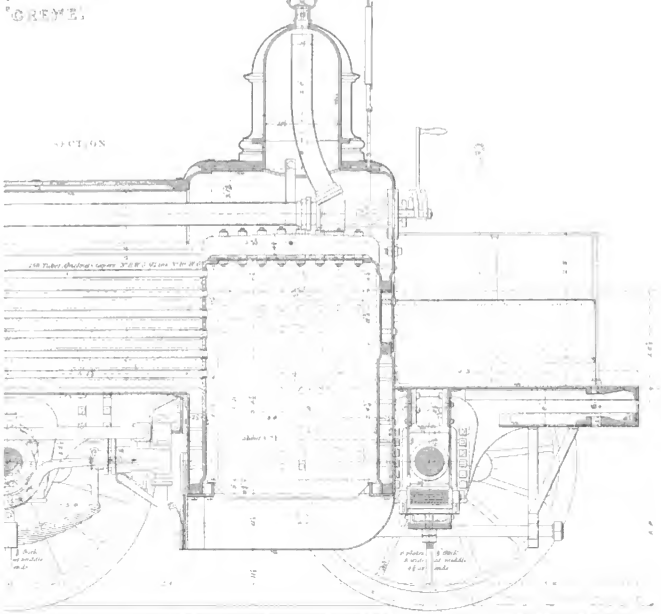
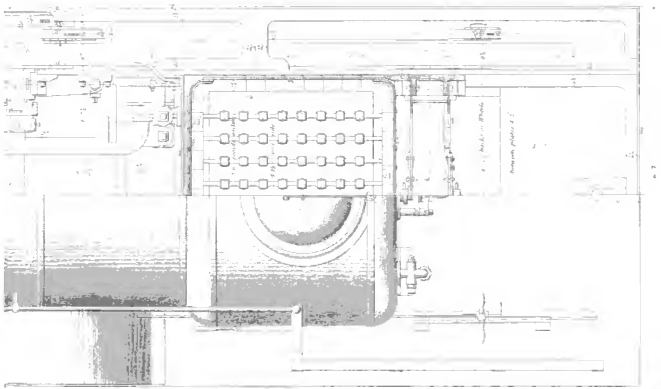
SECTION





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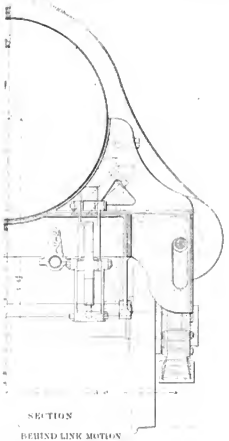
MOTIVE CREWE.



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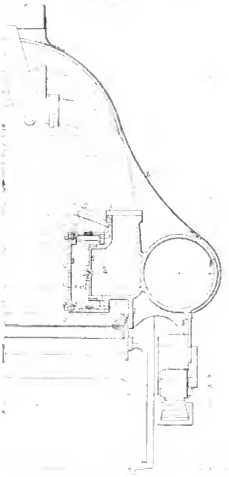
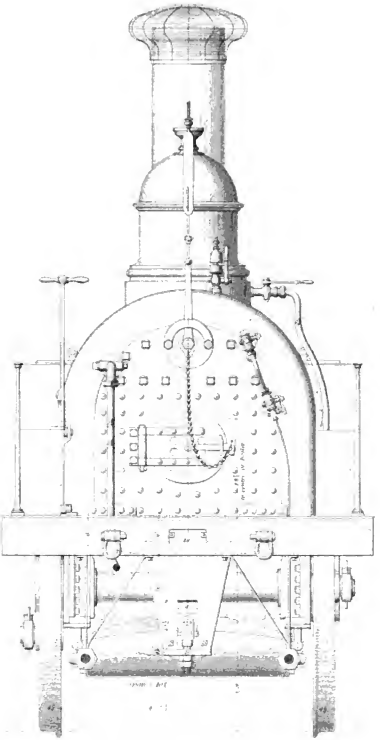
BEHIND LINK MOTION



SECTION
AT SMOKE-BOX



END ELEVATION AT FIRE BOX

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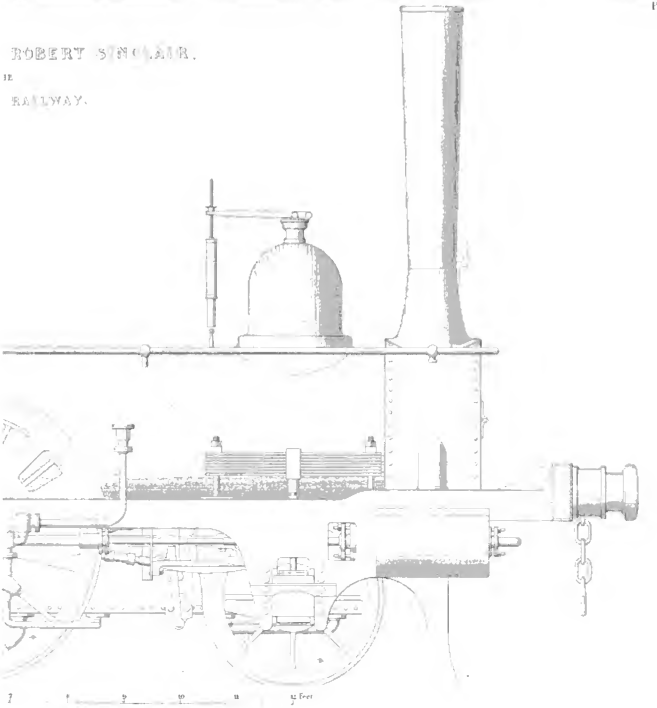
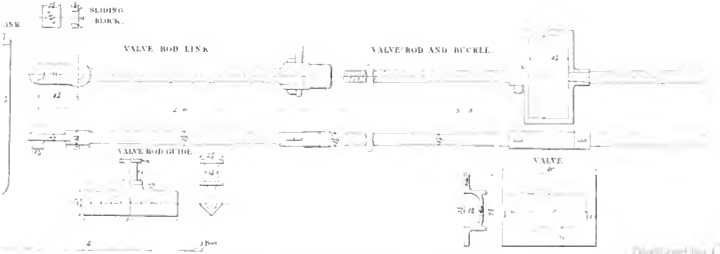
ROBERT SINCLAIR.

IE

RAILWAY.



LVE-GEAR.



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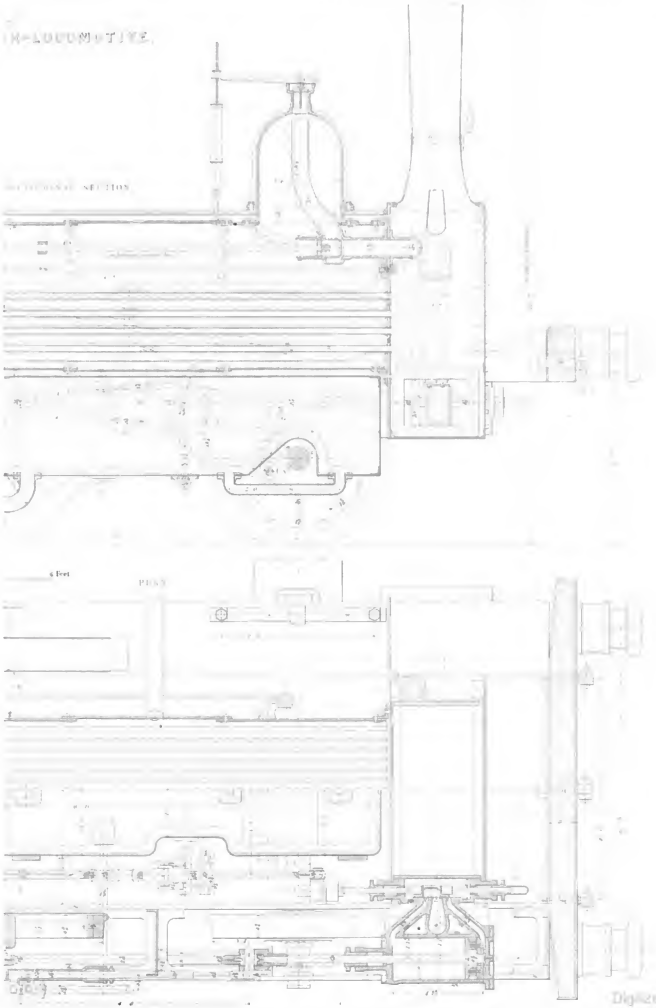

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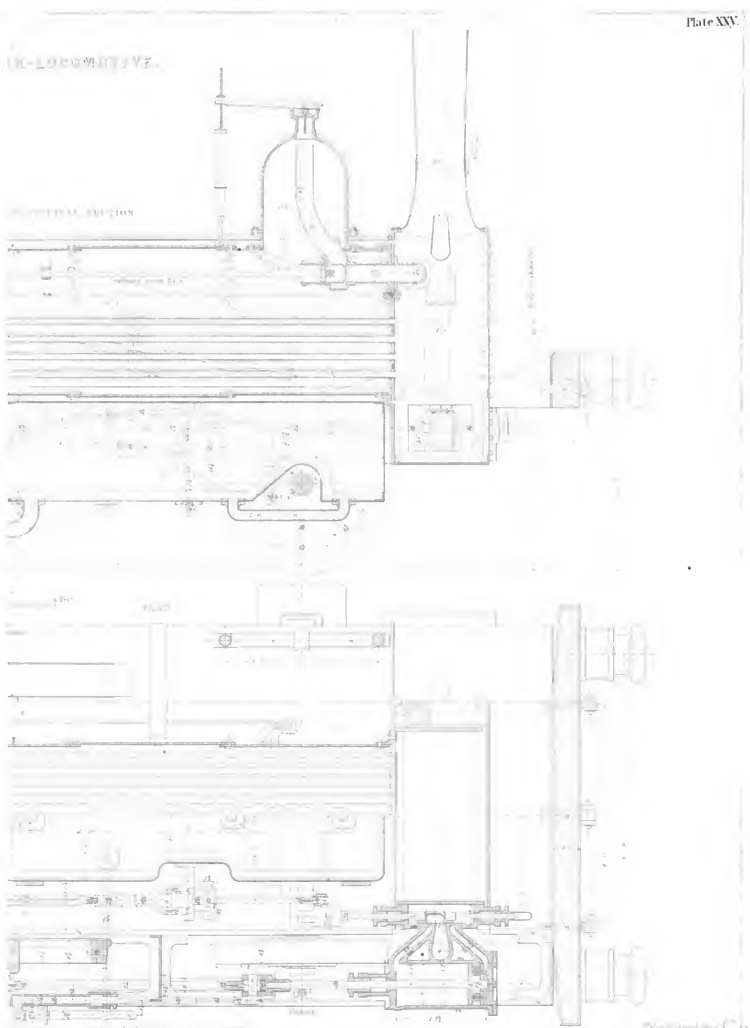

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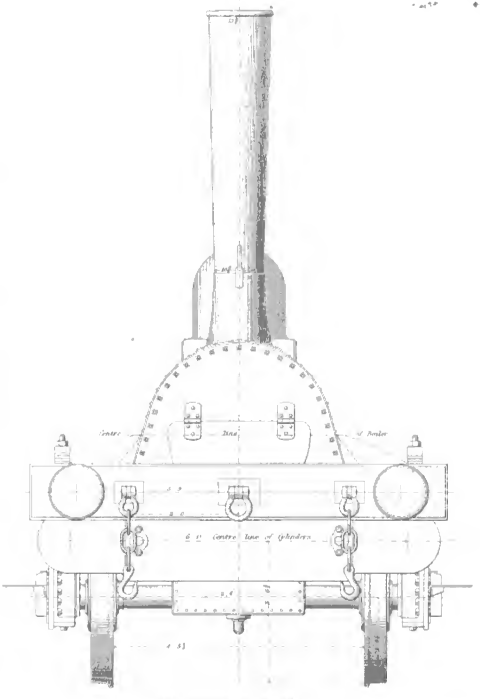

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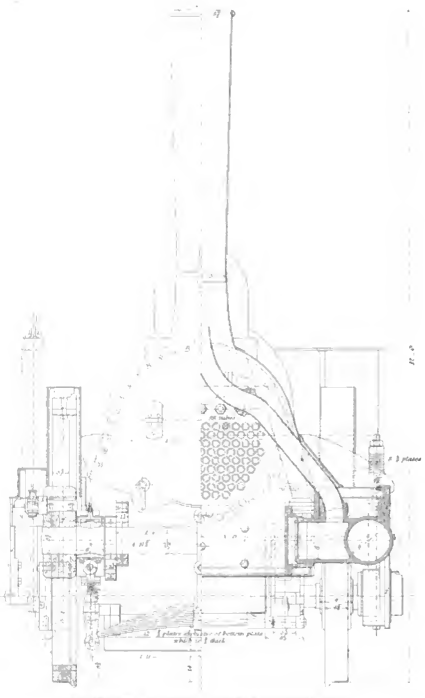

TRANSVERSE SECTION THROUGH DRIVING AXLE & SMOKE BOX

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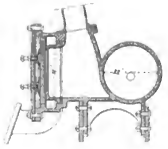
JOHN V. GOOCH, LONDON.

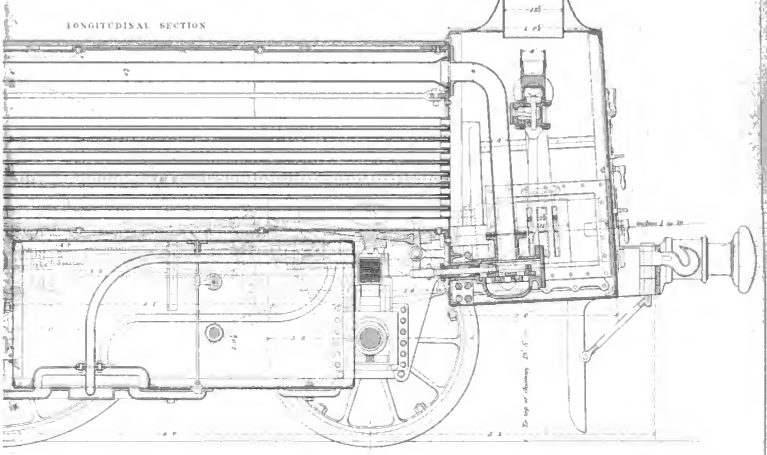
THE

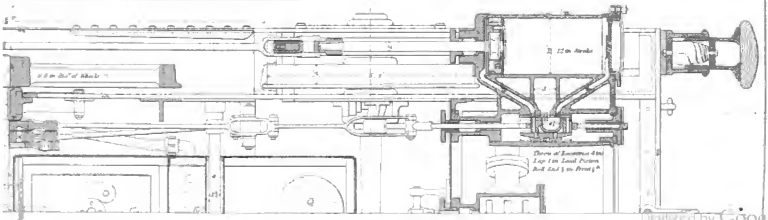
GES RAILWAY.



SECTION OF CYLINDER CASTINGS.

LONGITUDINAL SECTION





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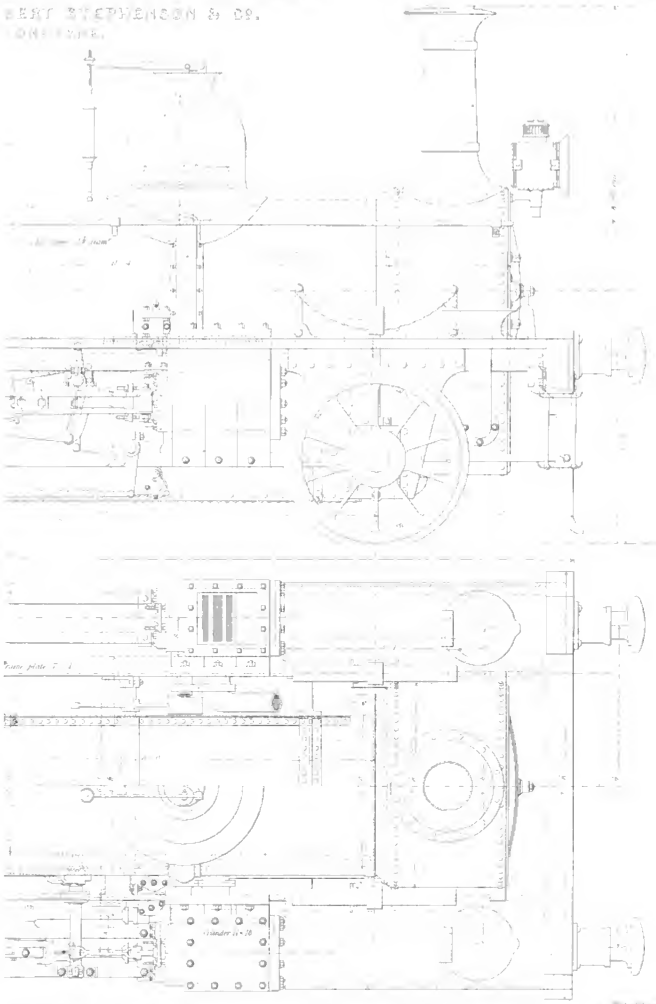

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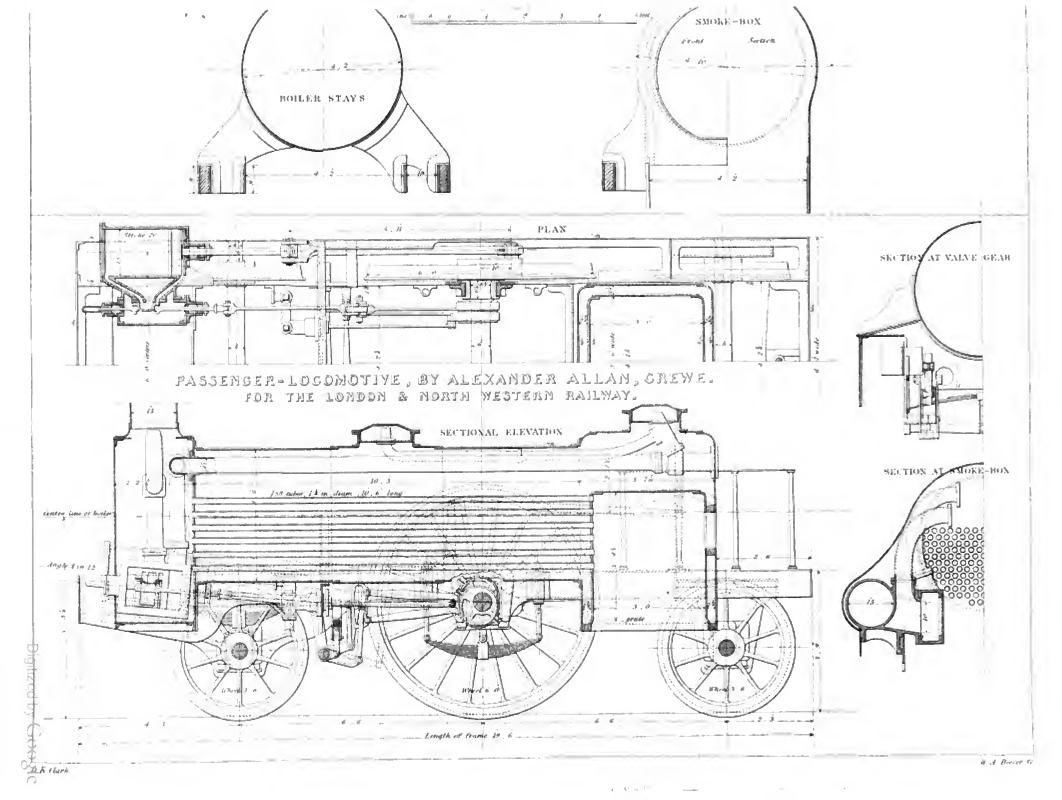
BOILER STAYS
SMOKE-BOX
PLAN
SECTION AT VALVE GEAR
PASSENGER-LOCOMOTIVE, BY ALEXANDER ALLAN, CREWE.
FOR THE LONDON & NORTH WESTERN RAILWAY.
SECTIONAL ELEVATION
SECTION AT SMOKE-BOX

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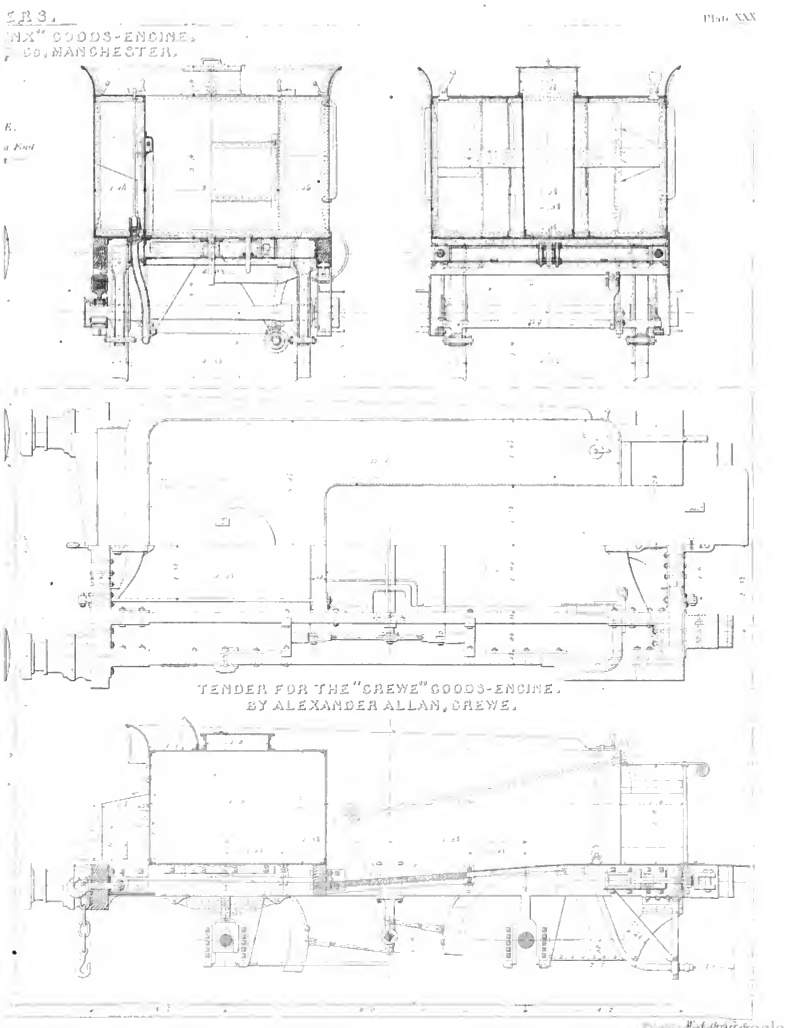

TENDER FOR THE "CREWE" GOODS-ENGINE.
BY ALEXANDER ALLAN, CREWE.

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S CARRIAGE,
TERN RAILWAY.
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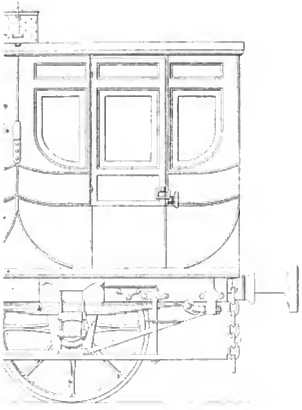

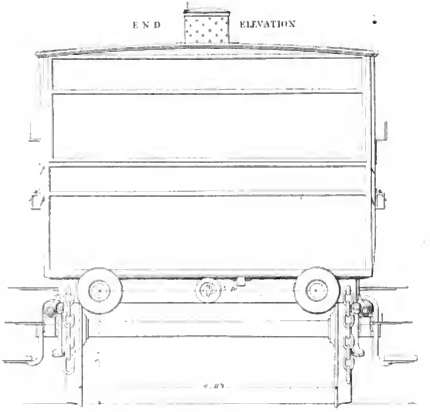

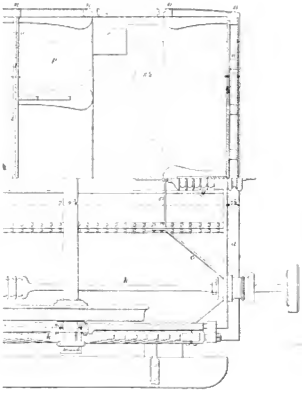

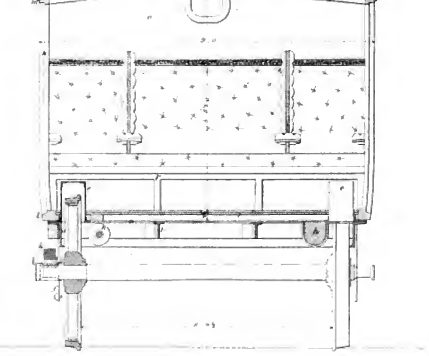

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S CARRIAGE

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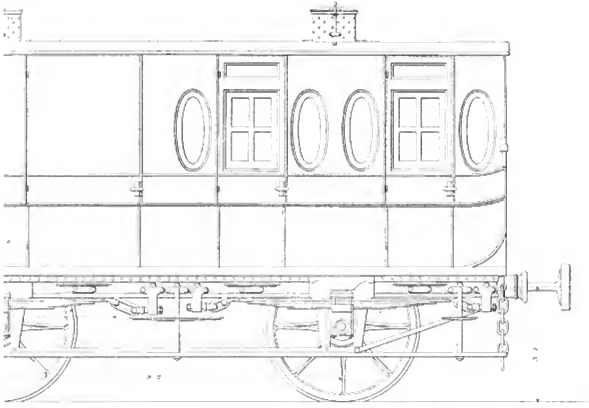

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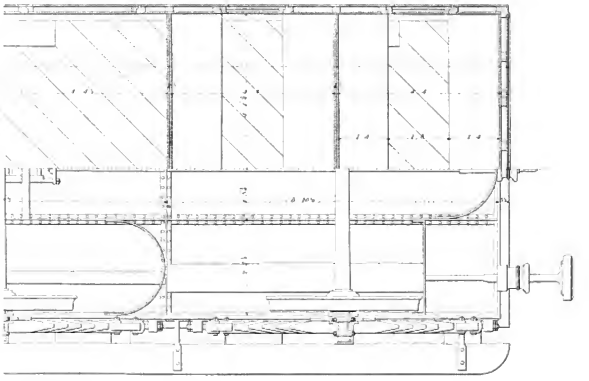

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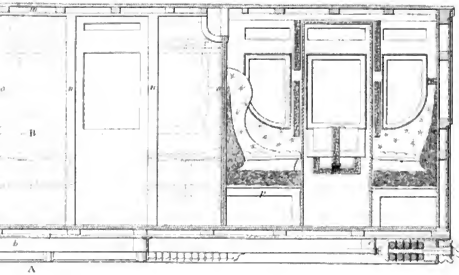
GREAT WESTERN RAILWAY.

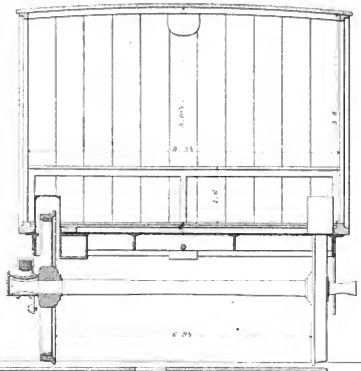
L SECTION



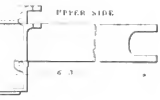
E, BRISTOL & EXETER RAILW

BOX

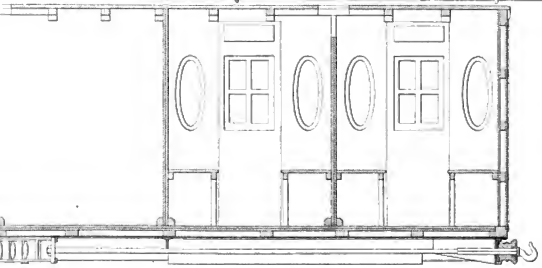
CROSS SECTION



SPRING



AL SECTION



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W. A. Brewer Sc.

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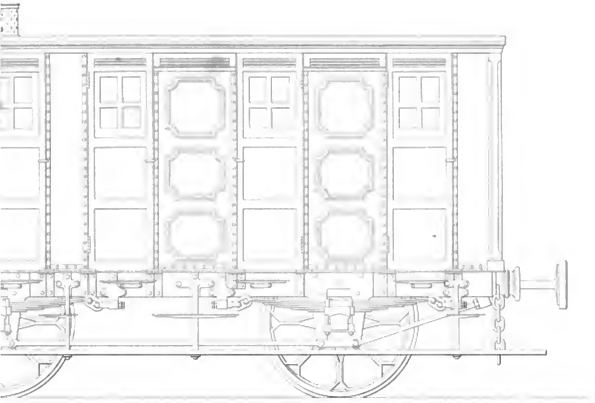
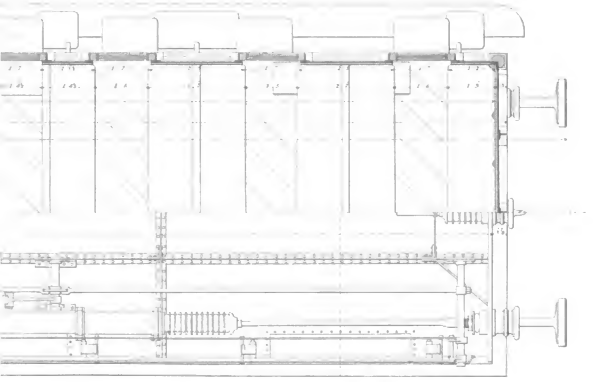
S CARRIAGE.
ERN RAILWAY.



VATION.

ARRIAGE BODY.



ER SIDE OF FRAME

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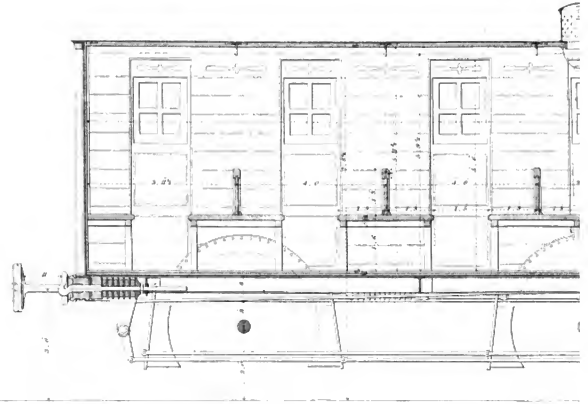
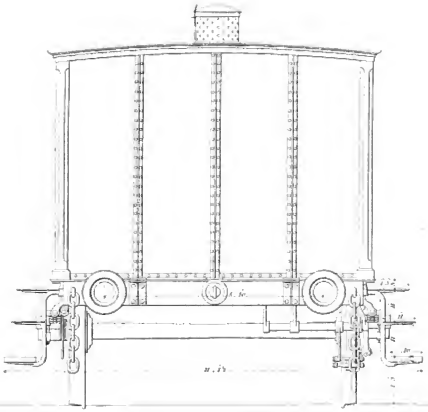
THIRD CLAS

GREAT WEST



LONGITUDIN



END ELEVATION.

Sections of Iron employed in t

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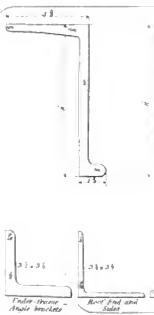

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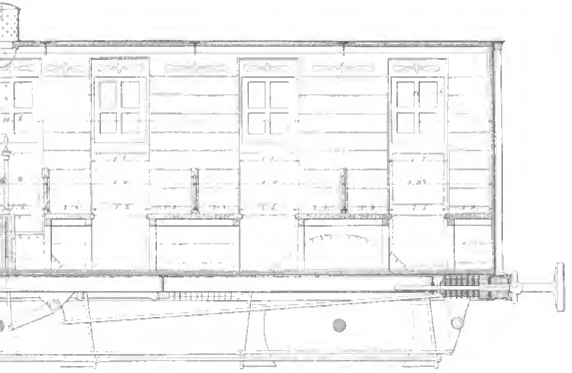
D. K. Clark

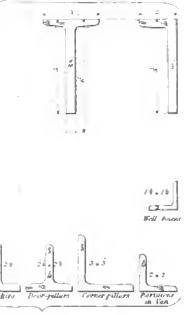
S CARRIAGE.
EEN RAILWAY.



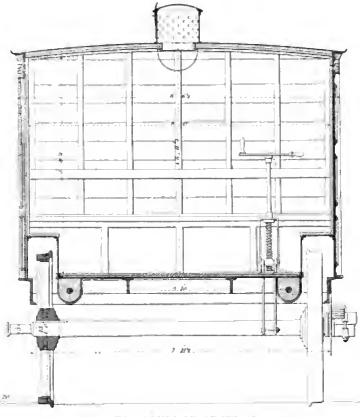
AL SECTION.

Framing of 3d Class & Luggage Van

K FRAME.



BODY.



TRANSVERSE SECTION

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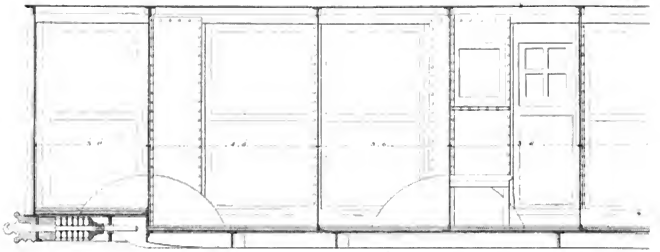
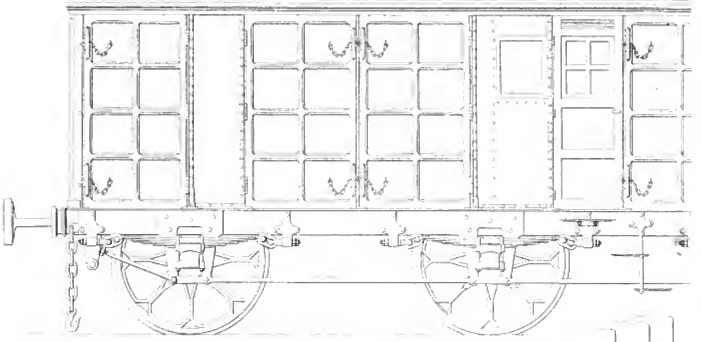
LUCCA

GREAT WEST

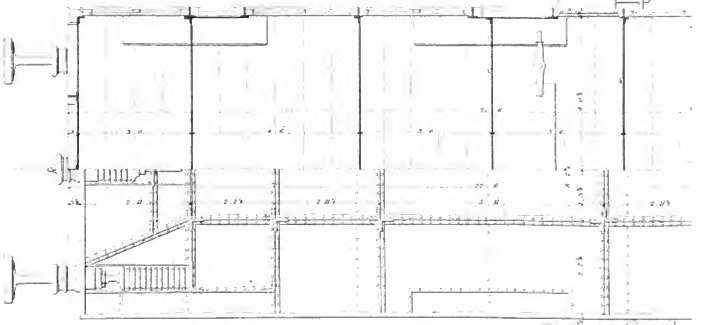
LONGITUDINAL SECTION



SIDE ELEVATION.



HALF PLAN OF BODY



HALF PLAN OF UNDER FRAME.

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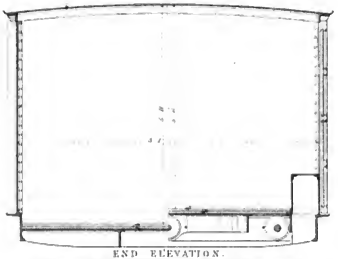
D. B. Clark

CE VAN.

ERN RAILWAY.

TRANSVERSE SECTION.

THROUGH CENTRE COMPARTMT. THROUGH END COMPARTMT.



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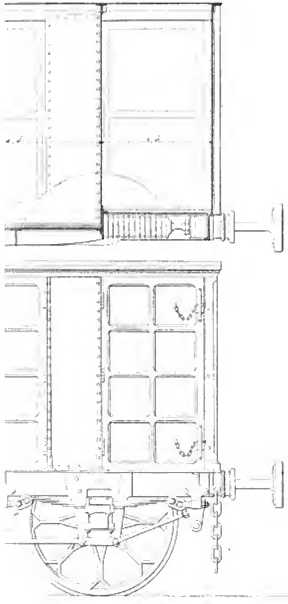

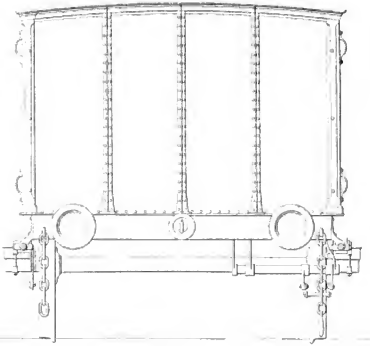

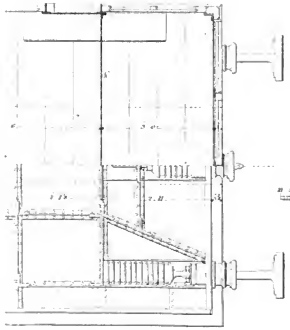

Note. The Brake gear is omitted for want of space. It is the same in design and arrangement as the 3rd class brake.

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W. J. Reeves Sc.

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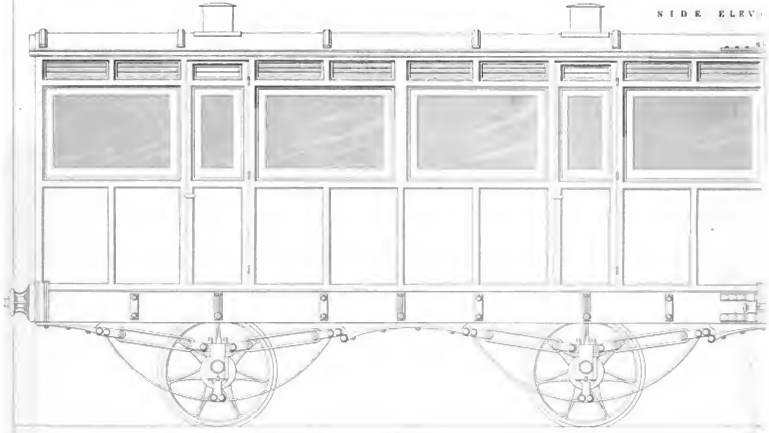
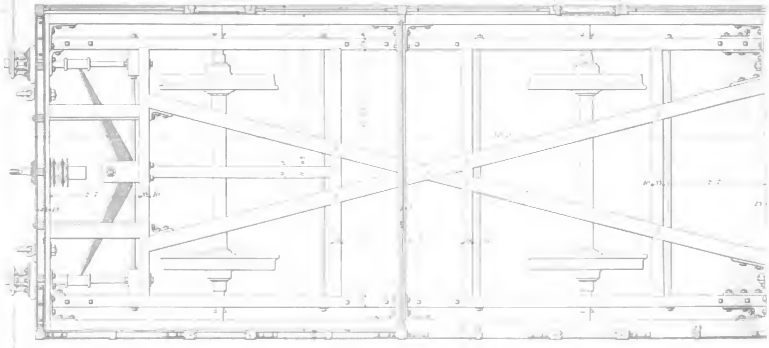
FIRST & SECOND CLASS COMPT
FOR
EASTERN COUN

SIDE ELEV



TOTAL LENGTH

PLAN OF UNDER FRAME AND BODY FRAMING



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OSITE CARRIAGE. BY W. B. ADAMS,
THE
TIES RAILWAY.

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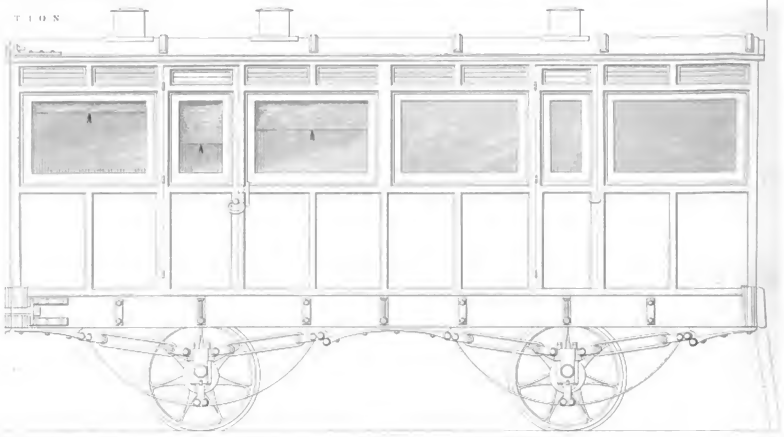
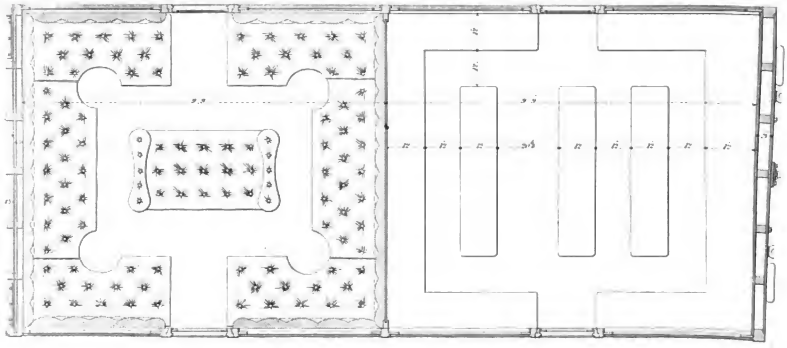


OF BODIES 30 FEET

PLAN OF BODIES



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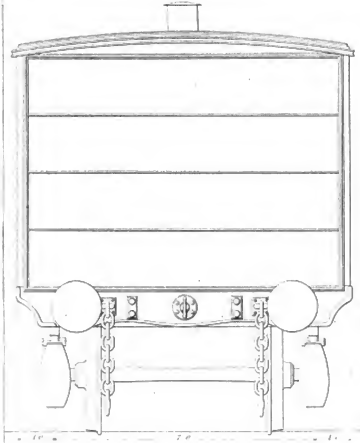
ADAMS' COMPO

END ELEVATION



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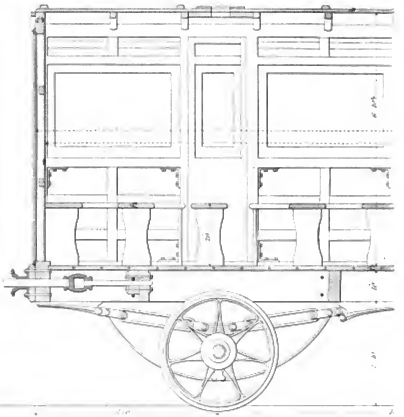
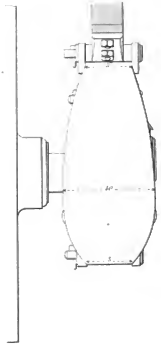
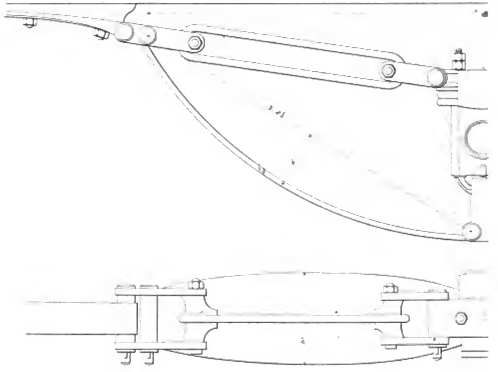


DETAIL OF BE





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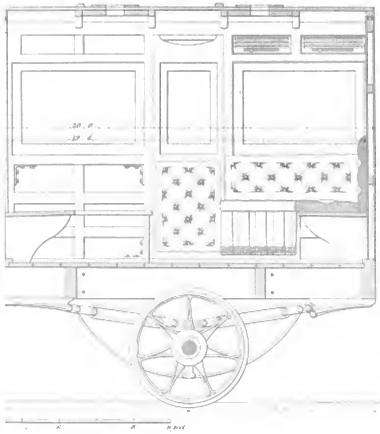
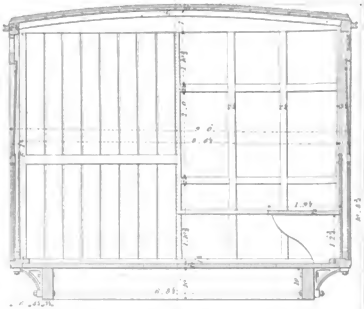
ITE CARRIAGE.

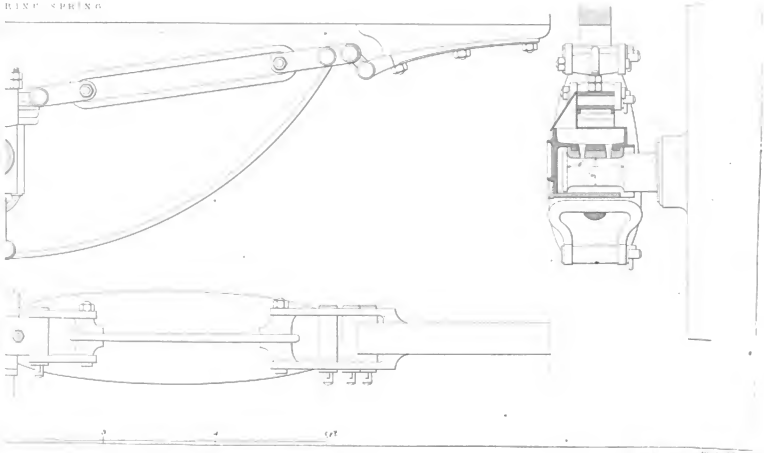
AL SECTION.



CROSS SECTIONS



RING SPRING



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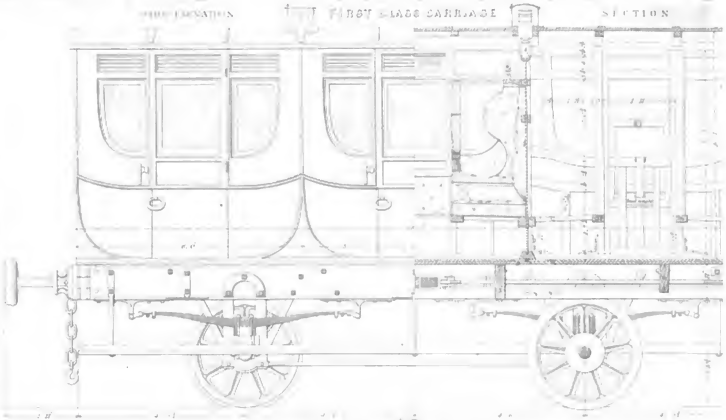

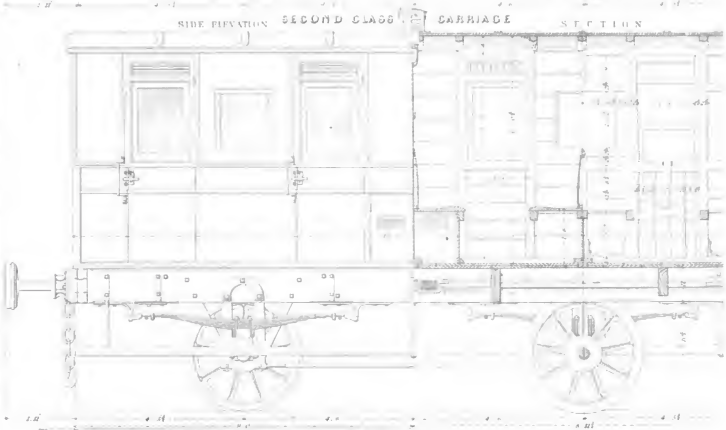

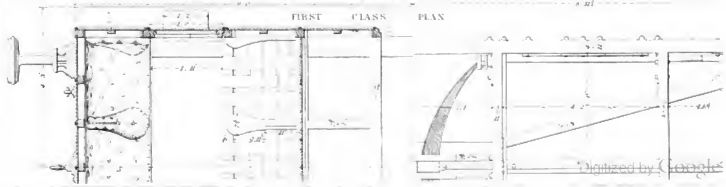

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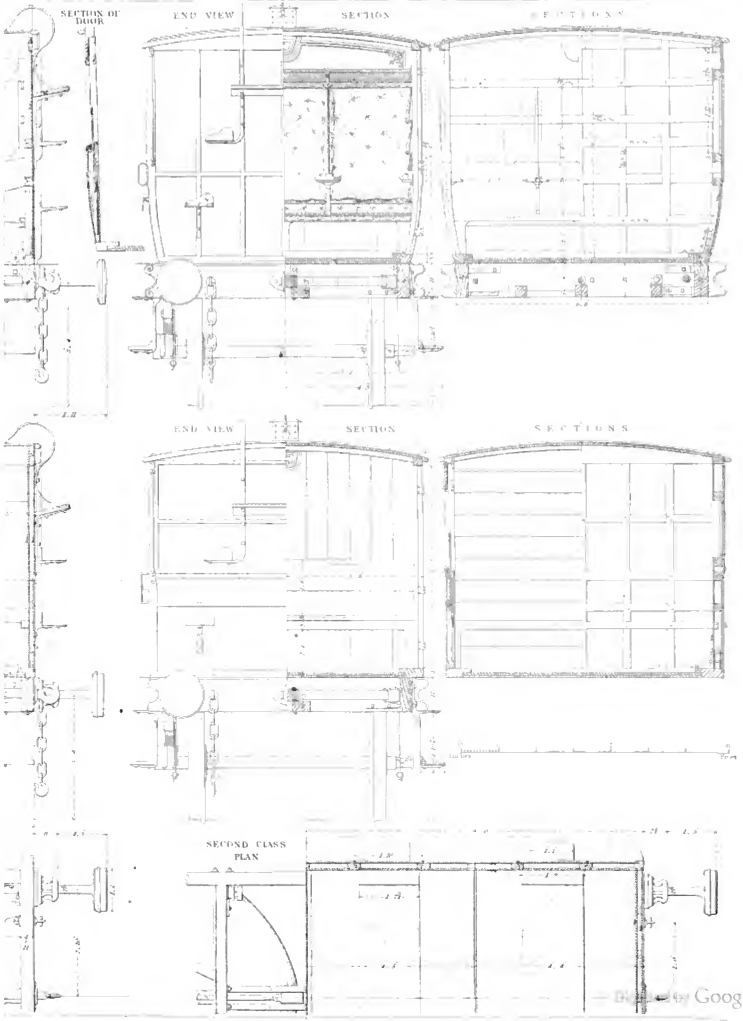

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RAILWAY CARRIAGES, BY BROWN

THIRD CLASS CARRIAGE.

SIDE ELEVATION

SECTION

PASSENGER'S LUGGAGE VAN.

ELEVATION

THIRD CLASS

PLAN

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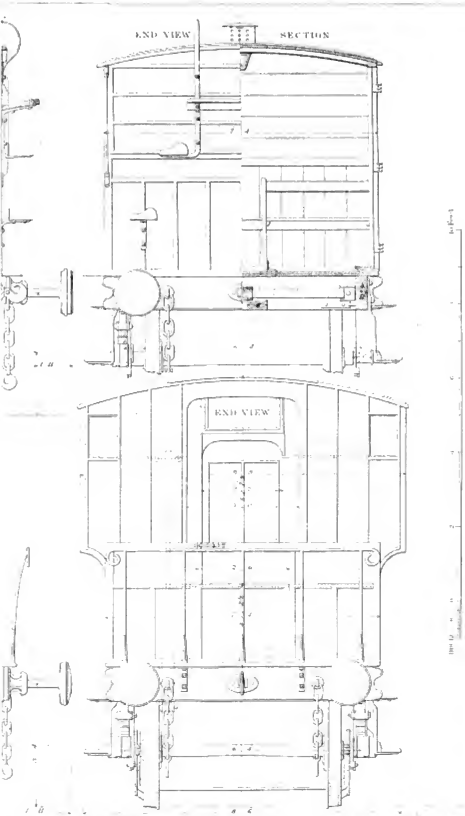
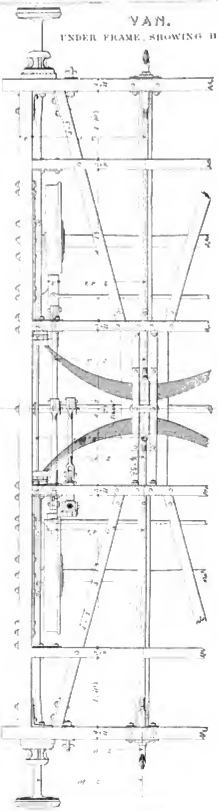
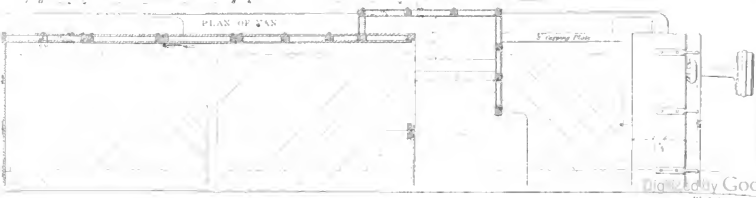


VAN.

UNDER FRAME, SHOWING BRAKE





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W. J. Harper, sc.

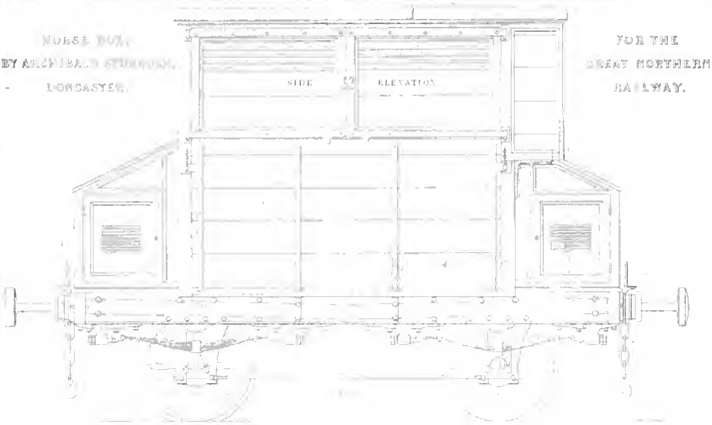
Digitized by Google

Digitized by Google

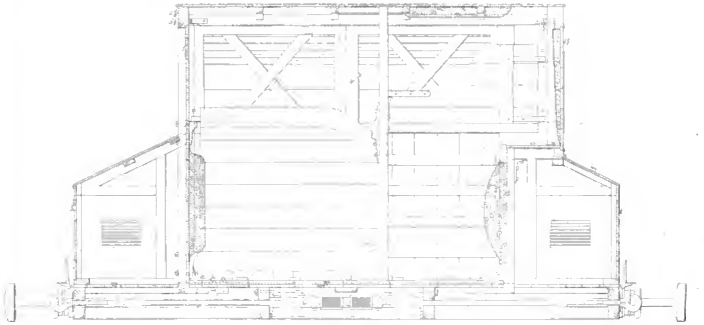
HORSE BOX.
BY ARCHIBALD STIRRUP,
LONDASTER.

SIDE ELEVATION

FOR THE
GREAT NORTHERN
RAILWAY.



LONGITUDINAL SECTION



PLAN

Inches 0 1 2 3 4 5 6 7 8 9 10 Feet

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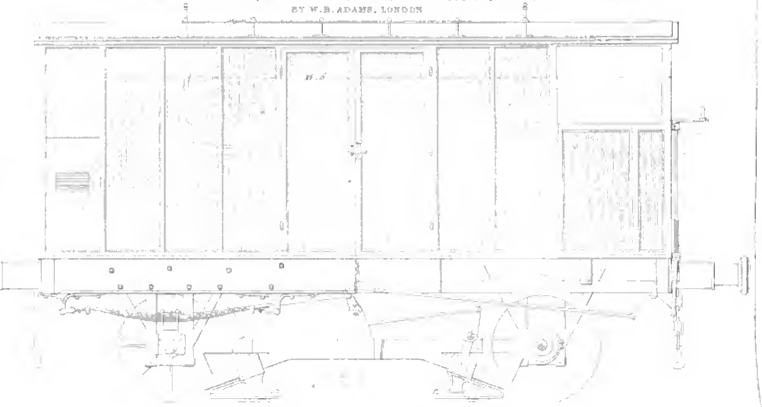
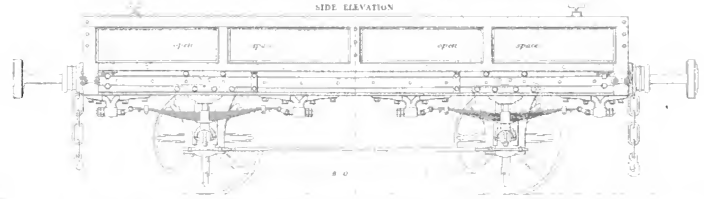
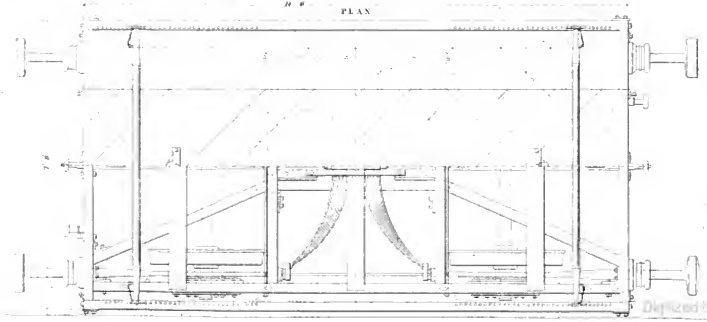
PASSENGER LUGGAGE VAN, WITH CORRUGATED IRON SIDES, AND SLEDGE BRAKE.
BY W. B. ADAMS, LONDON



CARRIAGE-TRUCK, BY A. STUMROCK, FOR THE GREAT NORTHERN RAILWAY.
SIDE ELEVATION



PLAN



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EDINBURGH & LONDON

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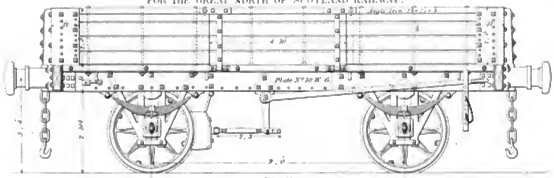
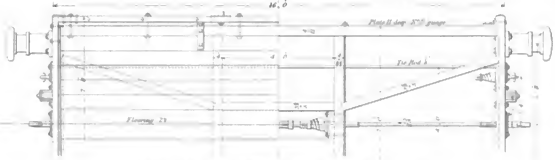
OPEN BOX WAGGON, BY D. K. CLARK,

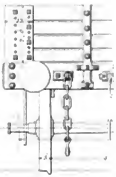
FOR THE GREAT NORTH OF SCOTLAND RAILWAY.



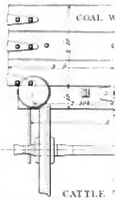
PLAN.



OPEN BOX

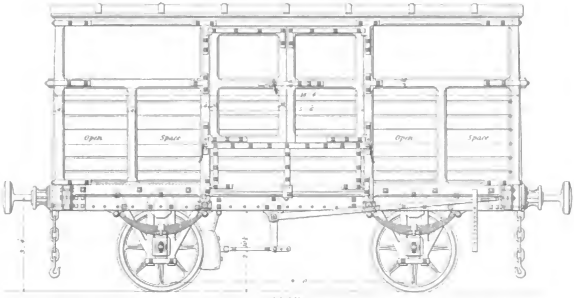


COAL W

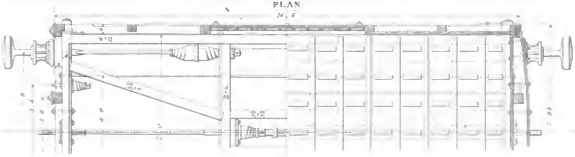


CATTLE WAGGON, BY D. K. CLARK,

FOR THE G. N. OF S. RAILWAY.



PLAN.

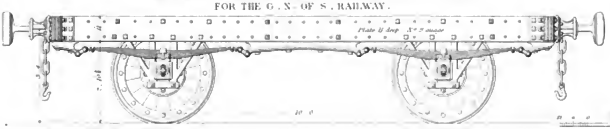


CATTLE

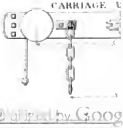
COKE W

CARRIAGE UNDERFRAME, BY D. K. CLARK,

FOR THE G. N. OF S. RAILWAY.



CARRIAGE U



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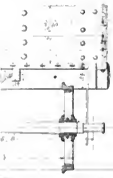
WAGGON.



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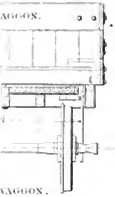
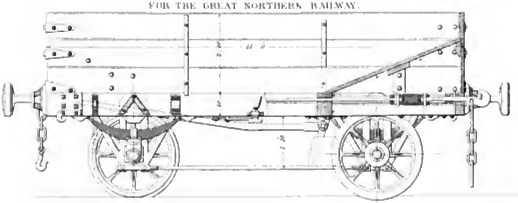


VAGGON.

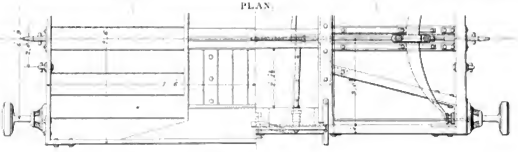
AGGON.

SIDEFRAME.

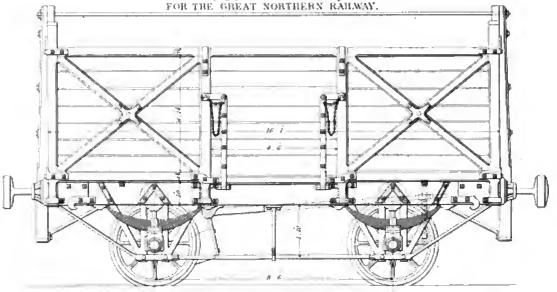
COAL WAGGON,
FOR THE GREAT NORTHERN RAILWAY.



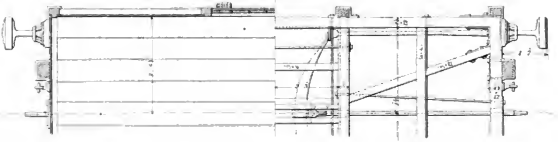
PLAN.



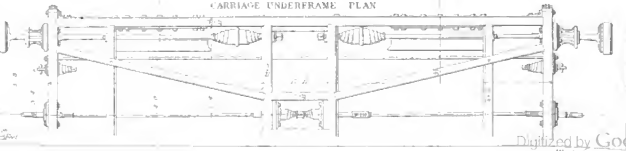
COKE WAGGON,
FOR THE GREAT NORTHERN RAILWAY.



PLAN.



CARRIAGE UNDERFRAME. PLAN.



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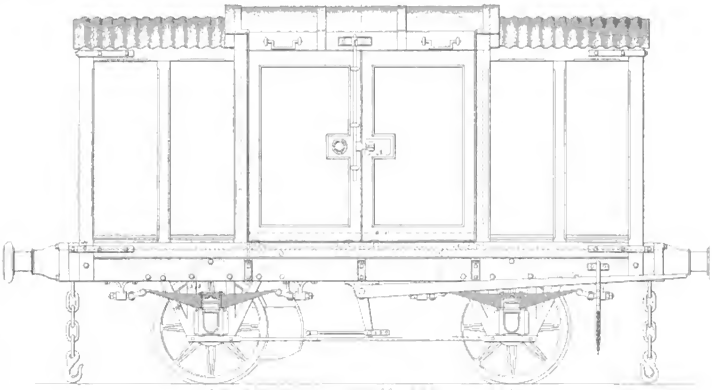
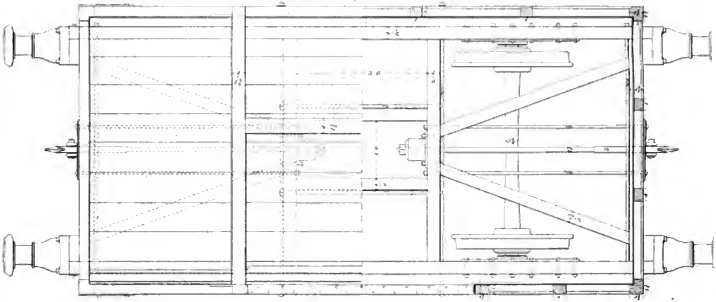
WAGGON STOCK OF THE LONDON & NORTH

COVERED GOODS WAGGO

SIDE ELEVATION



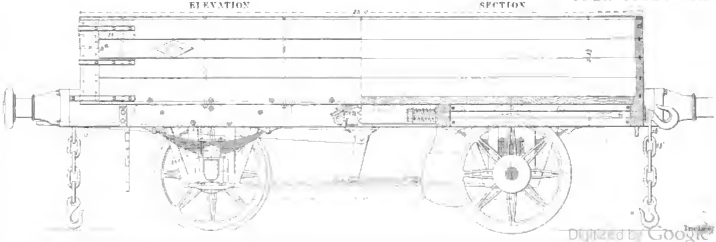
PLAN



OPEN GOODS WA

ELEVATION

SECTION



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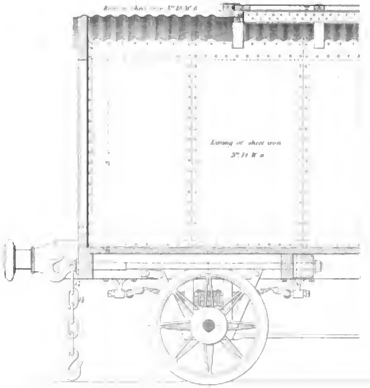
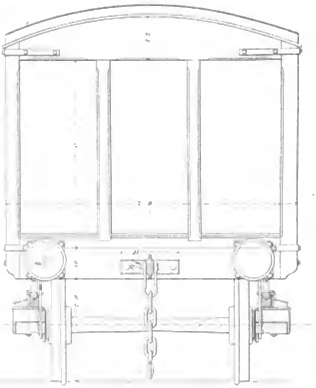
BY HENRY H. HENSON.

Plate XLIII.

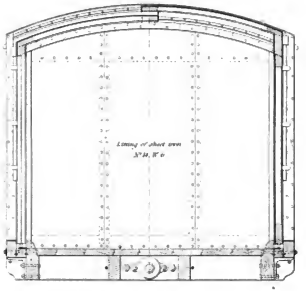
LONGITUDINAL SECTION



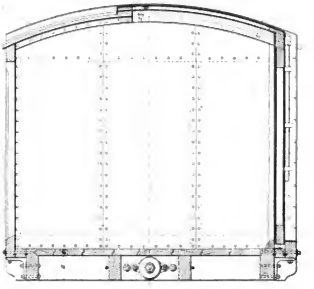
END ELEVATION.



TRANSVERSE SECTION N° 2

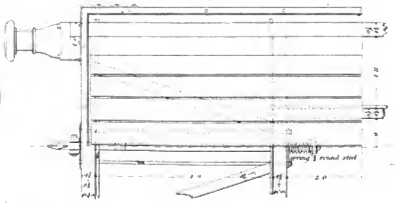


TRANSVERSE SECTION AT DOOR-WAY

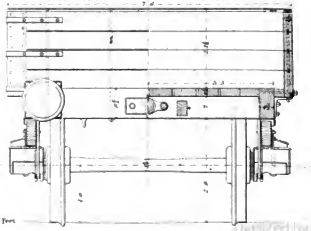


GON BY H.H. HENSON.

PLAN.



END VIEW SECTION



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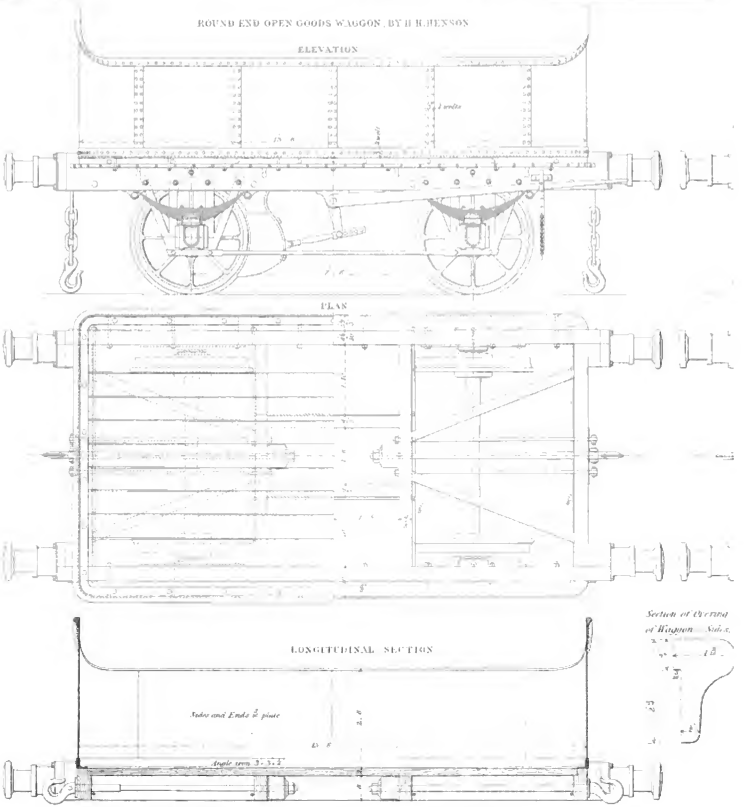

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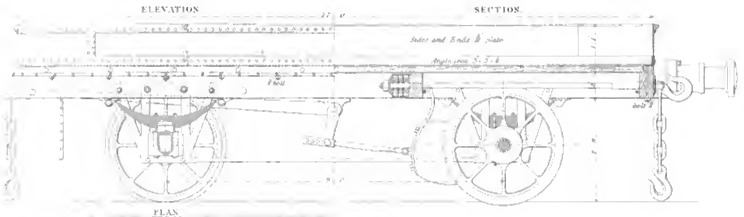
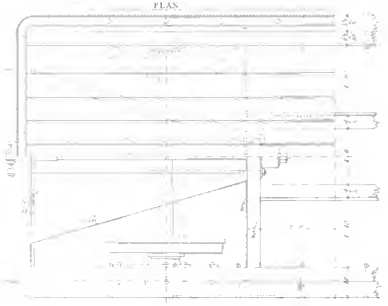
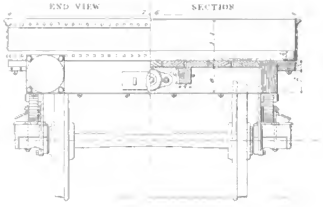
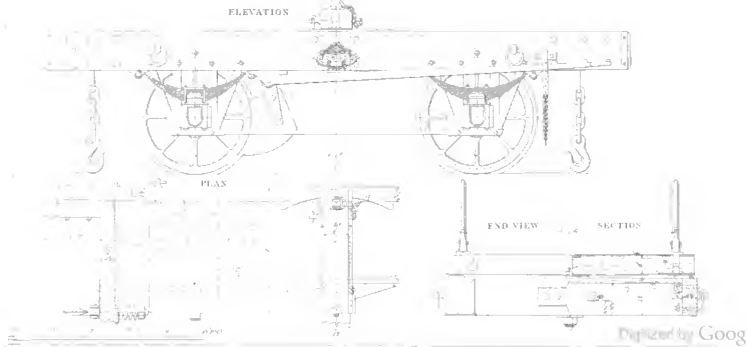
PLATFORM OR LOW SIDED WAGGON BY H. H. HENSON.







TIMBER TRUCK BY H. H. HENSON



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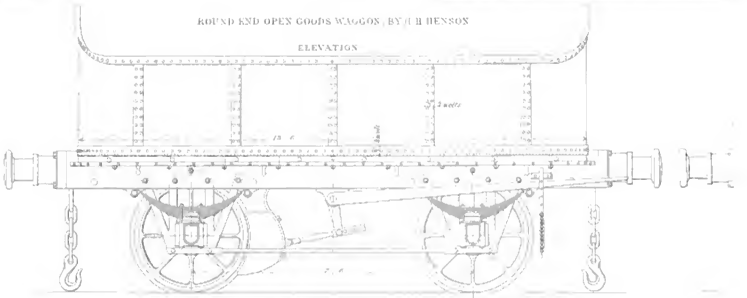
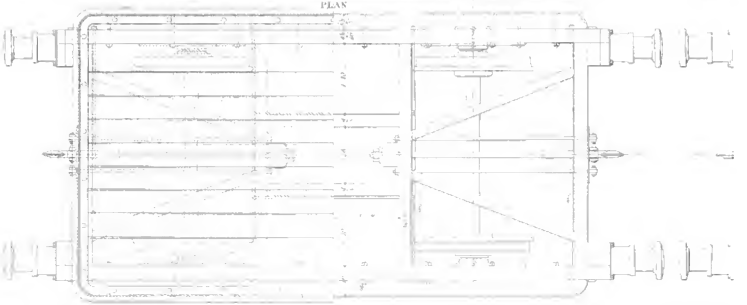
ROUND END OPEN GOODS WAGGON, BY G. H. HENSON

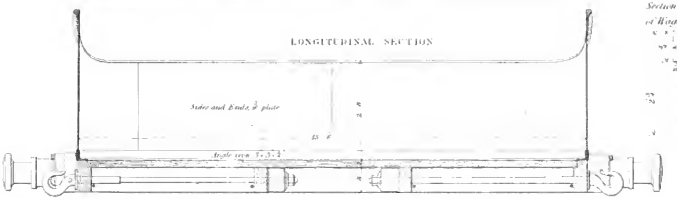
ELEVATION



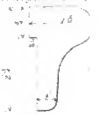
PLAN



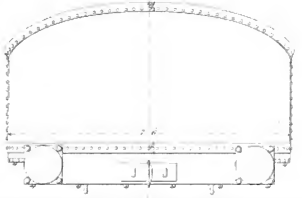
LONGITUDINAL SECTION



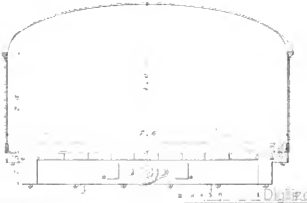
Section of Corner of Waggon Sides.



END VIEW



SECTION.



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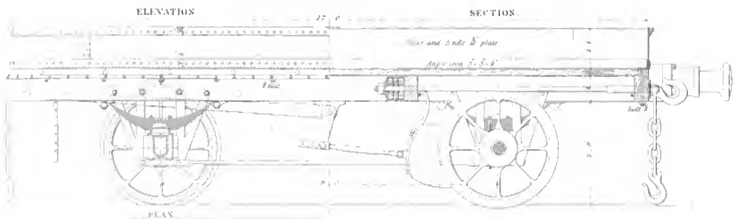
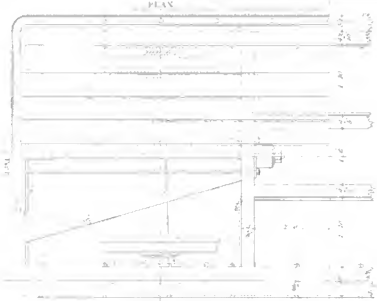
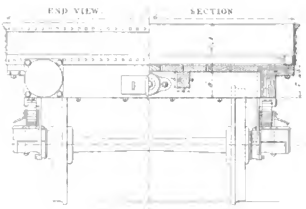
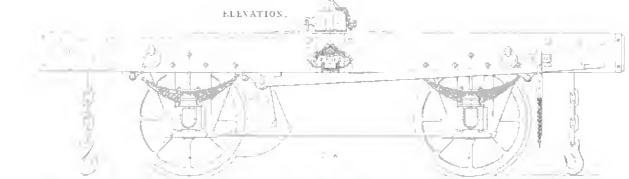
PLATFORM, OR LOW SIDED WAGGON BY H H HENSON.







TIMBER TRUCK BY H H HENSON



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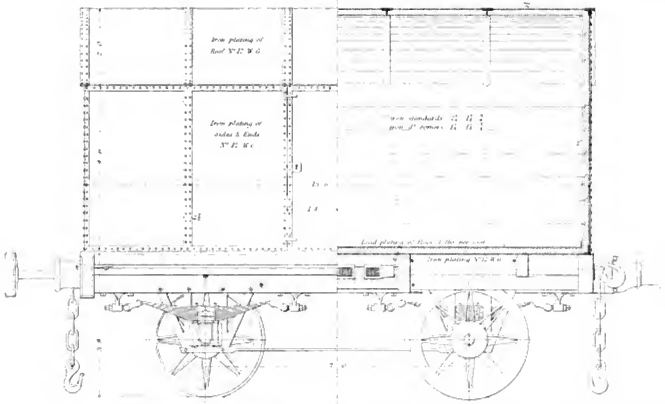
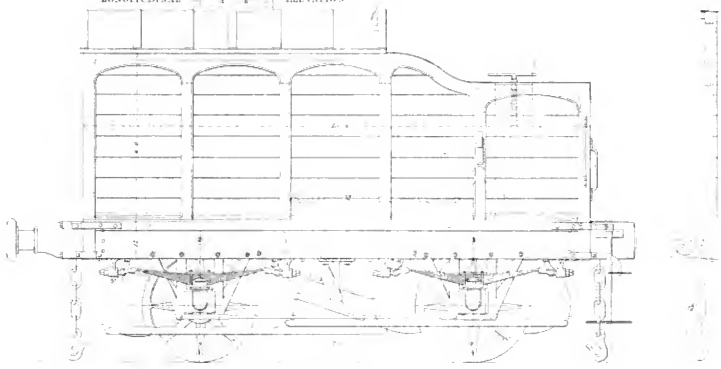
GUNPOWDER VAN

LONGITUDINAL ELEVATION AND SECTION



BRAKE VAN FOR GOODS TRAINS BY H.H. HENSON.

LONGITUDINAL ELEVATION



PLAN OF GUNPOWDER VAN

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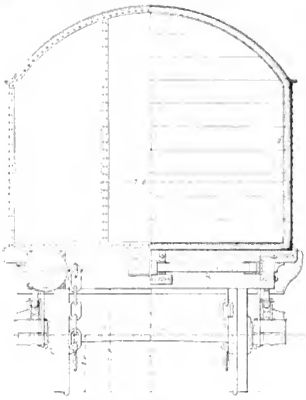
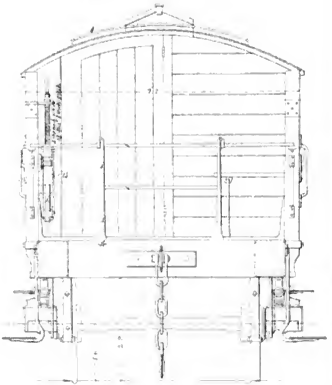
HENRY H. HENSON.

END ELEVATION

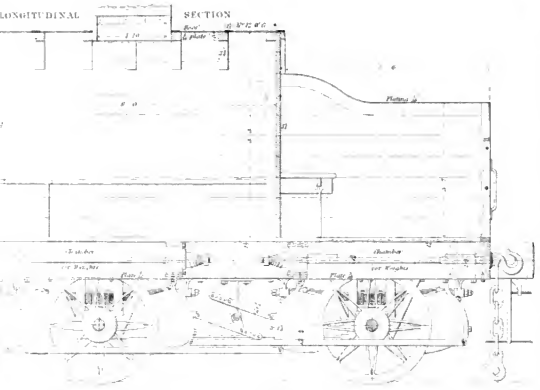
SECTION



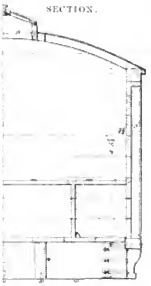
BRAKE VAN END ELEVATION



LONGITUDINAL SECTION

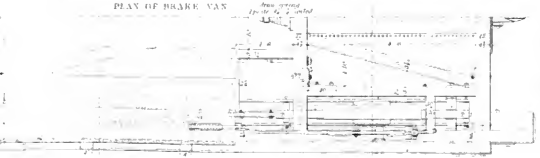


SECTION.



END ELEVATION.

PLAN OF BRAKE VAN



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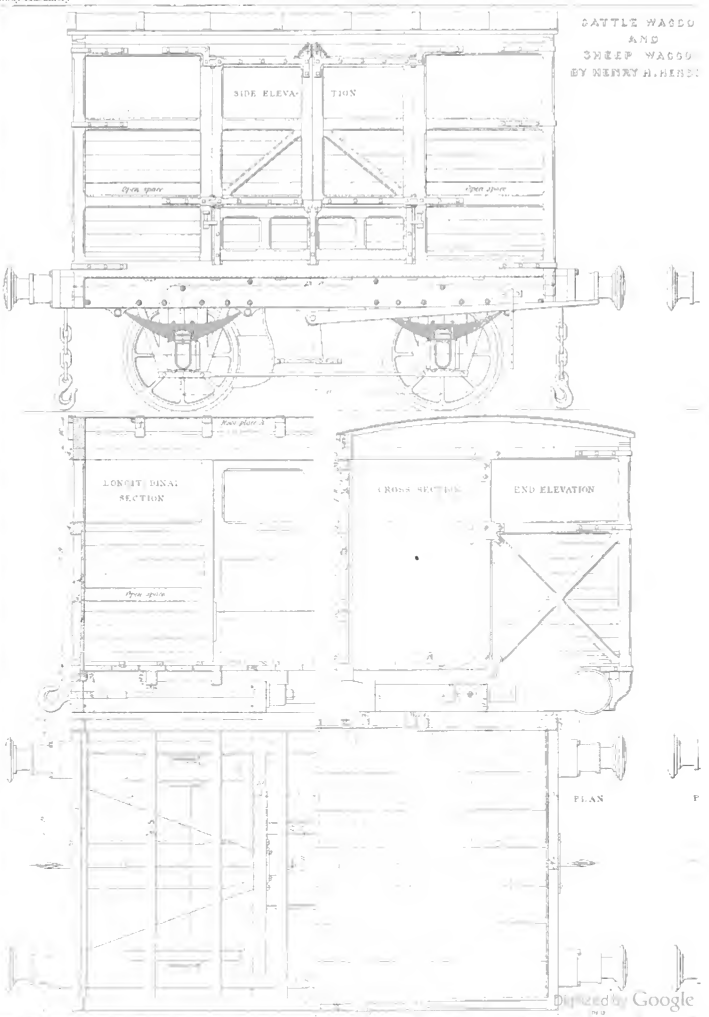
WAGGON STOCK OF THE LONDON & NORTH

CATTLE WAGGO
AND
SHEEP WAGGO
BY HENRY H. HENS



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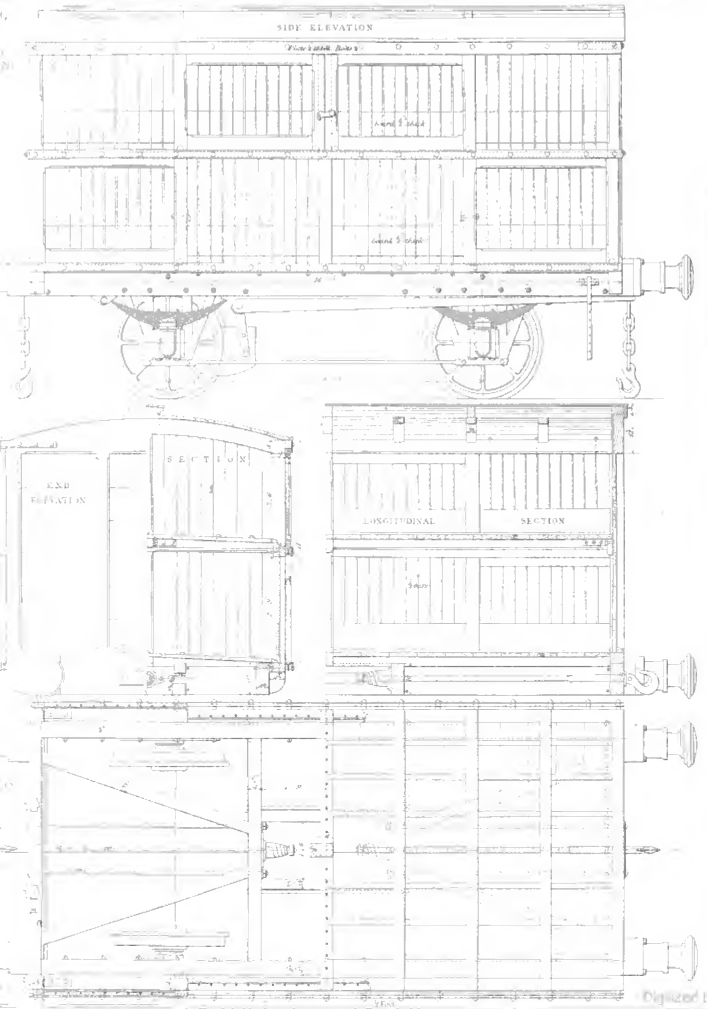

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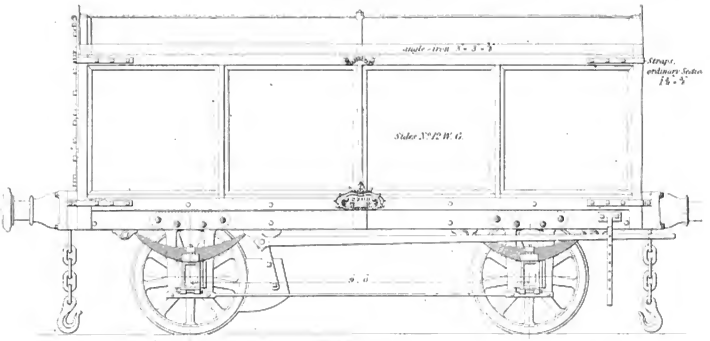
WAGGON STOCK OF THE LONDON & NORTH

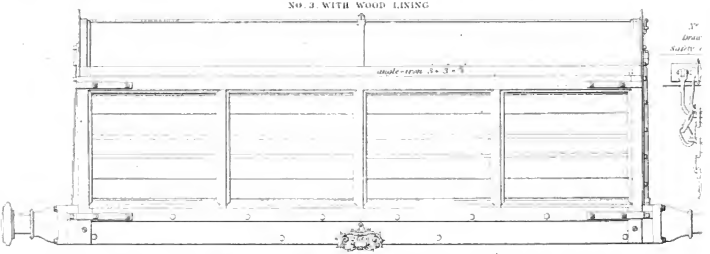
COKE WAGGONS B

No. 1. WITH FLAT IRON LINING.

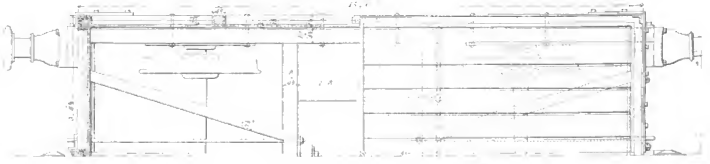


PLAN OF No. 1

No. 3. WITH WOOD LINING

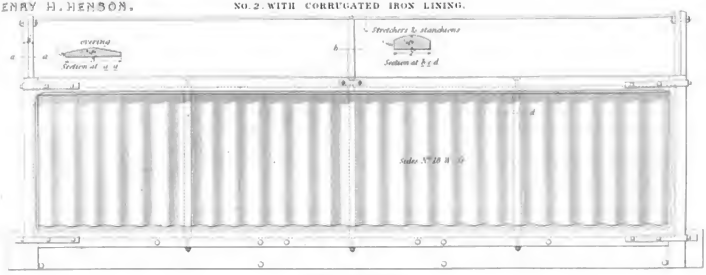


PLAN OF No. 3.



Digitized by Google

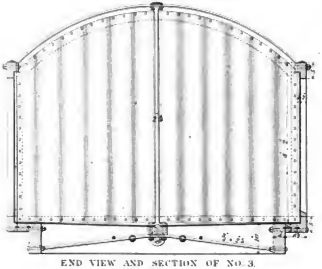
HENRY H. HENSON. NO. 2. WITH CORRUGATED IRON LINING.



PLAN OF NO. 2

CROSS SECTION OF NO. 2

END VIEW OF NO. 2



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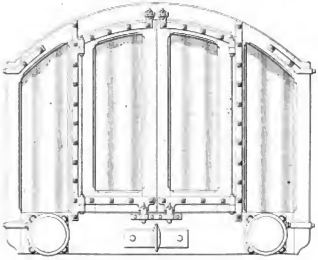
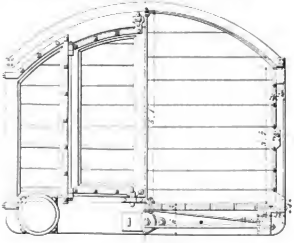
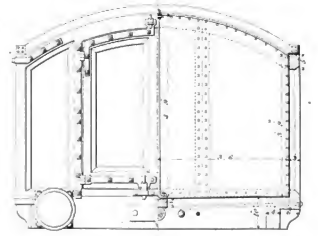


END VIEW AND SECTION OF NO. 1.





0 5 10 15 20 25 30 Feet

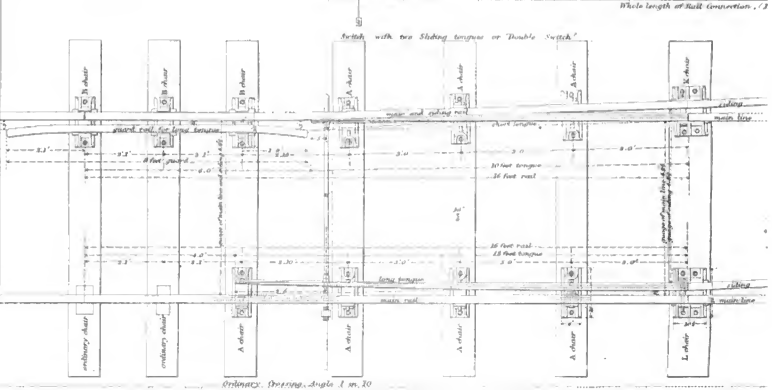
Digitized by Google

W. A. Brooks, A

Digitized by Google

SWITCHES AND CROSSINGS,
MADE FOR THE NOR

Plan of Railway, Showing arrangement of Switches and



Ordinary Crossing, Angle 1 in 10

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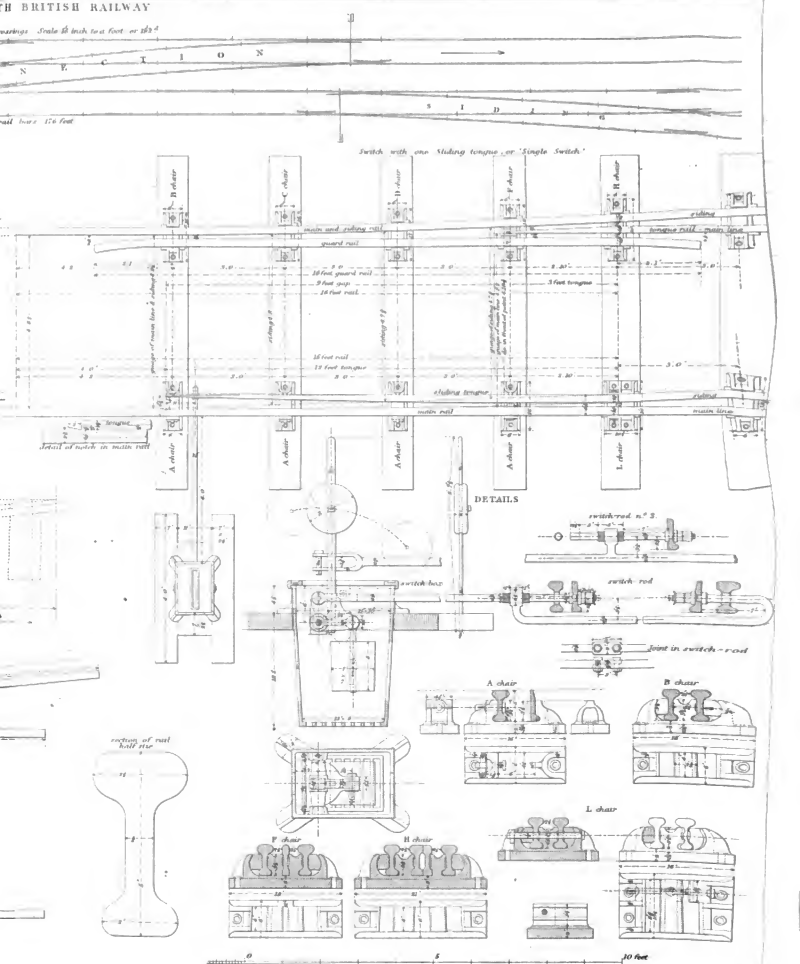

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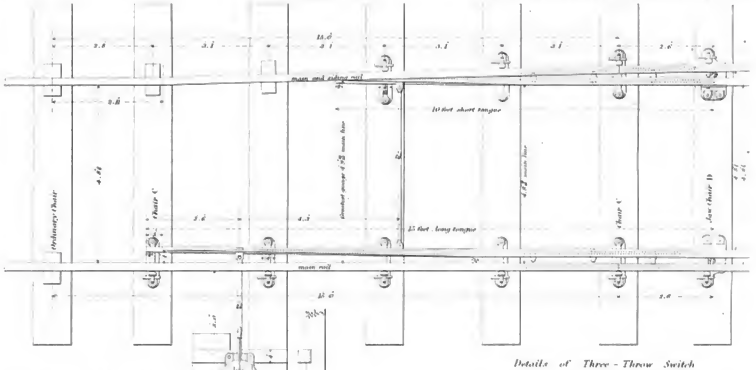
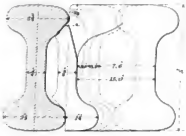
WILD'S SWITCHES AS MADE BY FD.

Ordinary Switch



Details of Three-Throw Switch

Ordinary Switch — Sectional View showing end of long tongue, and sections at intervals

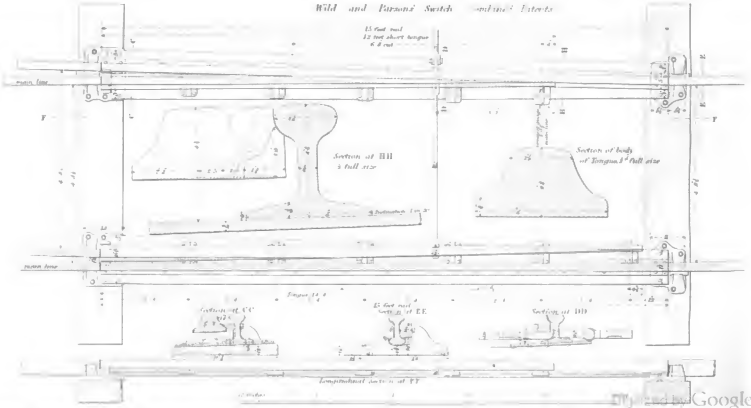


End View of Siding Rail. Showing end of long tongue. Full size

Section of Siding Rail and long tongue Showing end of short tongue. Full size Inclination of Rail 1 in 20

WILD AND PARSONS' SWITCHES AND CROSSINGS

Wild and Parsons' Switch — ordinary Pattern



Scale 1/12 Details

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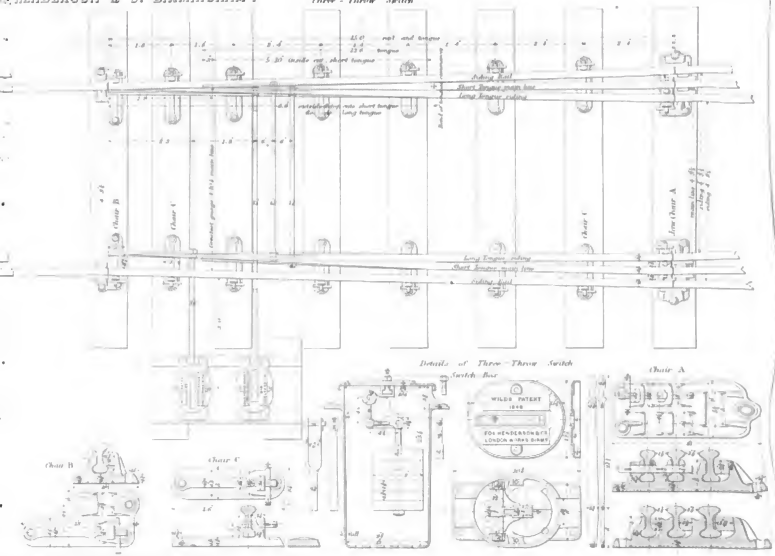
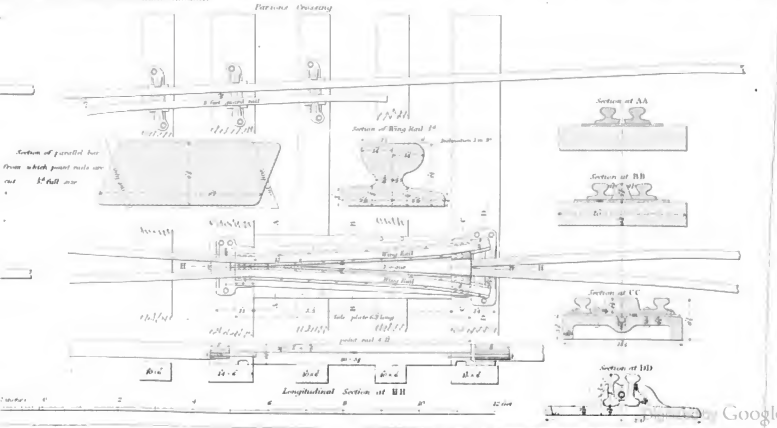
...HENDERSON & Co BIRMINGHAM.

Three - Throw Switch



Details of Three-Throw Switch

...MADE FOR THE GREAT NORTHERN RAILWAY



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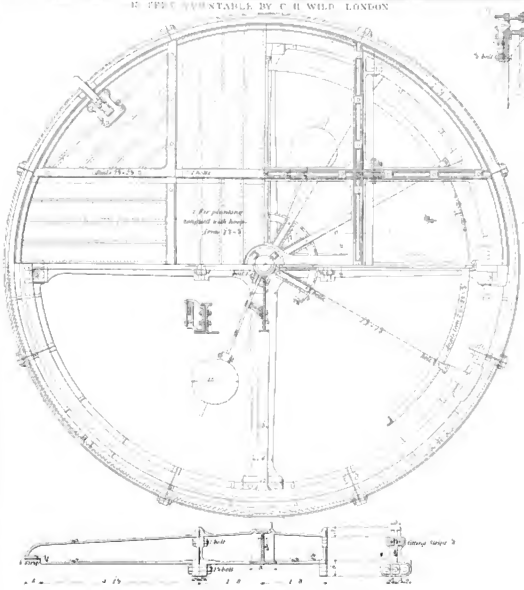
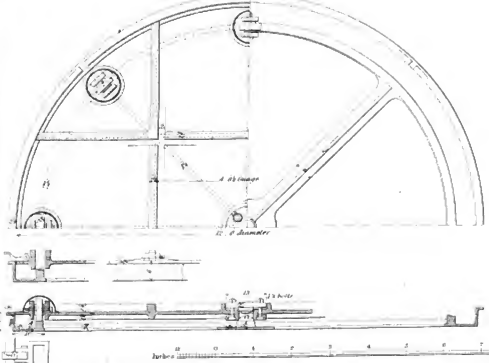
12 FEET TURNTABLE BY C. H. WILD LONDON



12 FEET TURNTABLE FOR THE UPPER FLOORS OF GOODS – SHEDS



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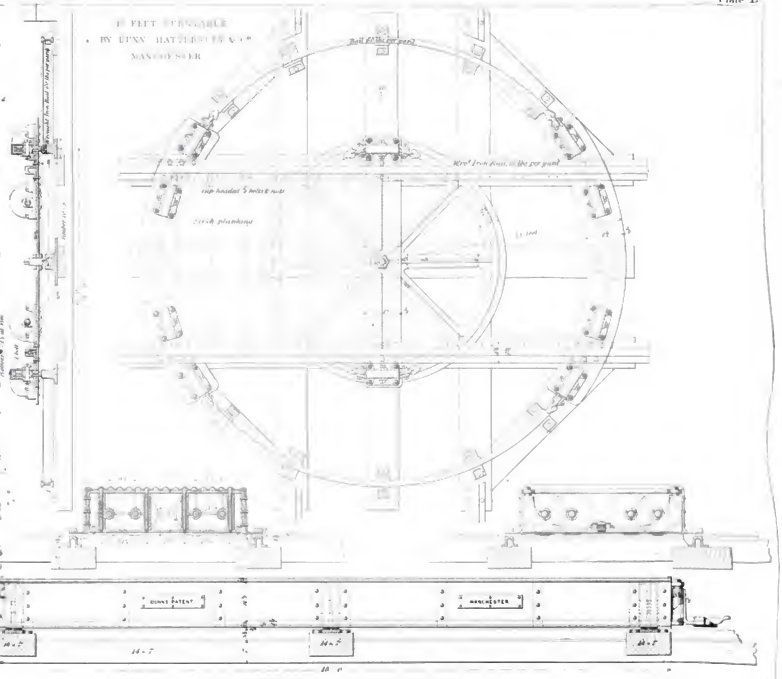
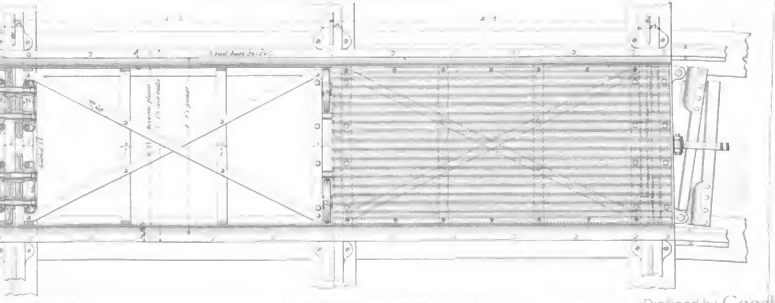


18 FEET TRAVERSER, BY DUNN, HATTERSLEY & Co.



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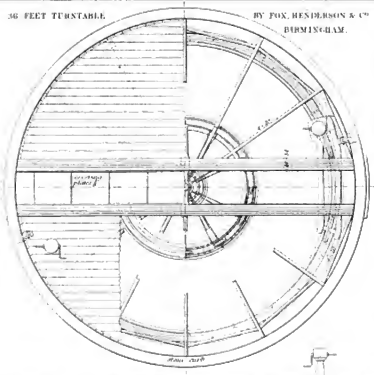
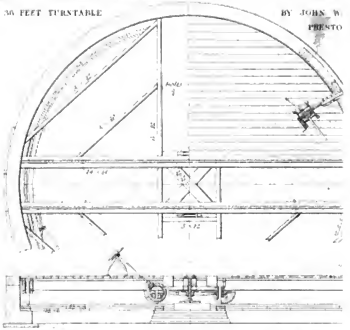
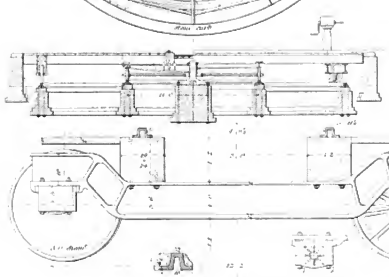
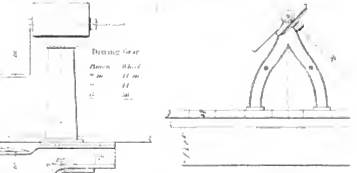
36 FEET TURNTABLE BY FOX, HENDERSON & Co BIRMINGHAM.

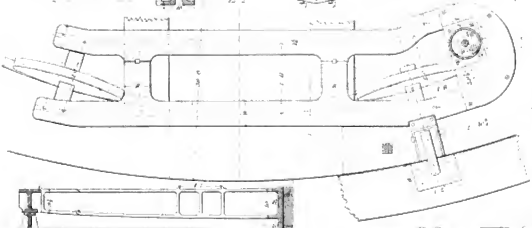


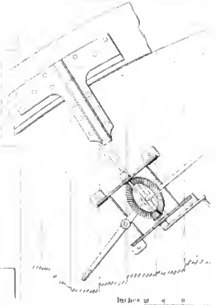
36 FEET TURNTABLE BY JOHN W PRESTO

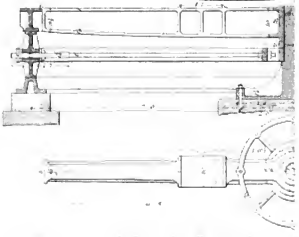


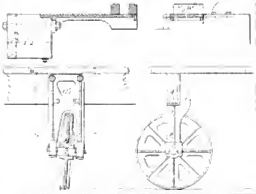












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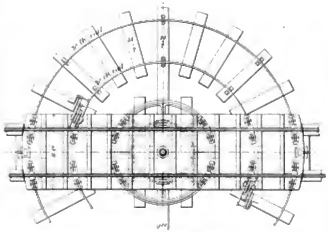
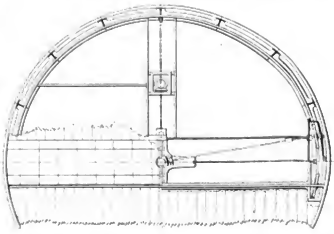
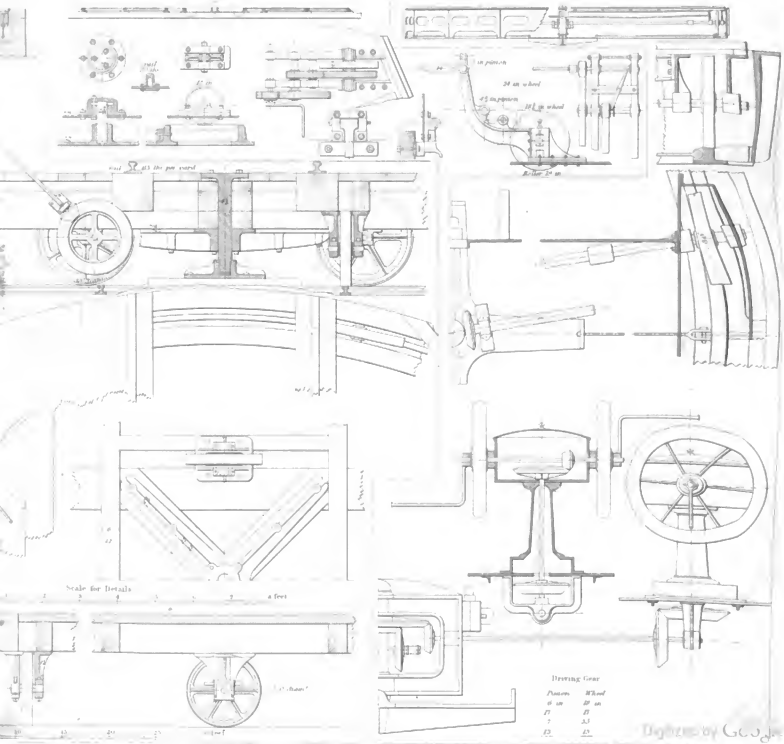
80 FEET TURNTABLE. BY DUNN HATTERSLEY & Co MANCHESTER



33 FEET TURNTABLE. BY YULE & WILKIE. GLASGOW





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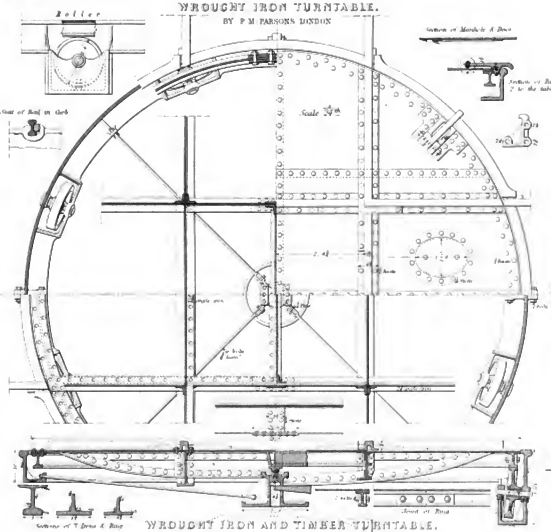
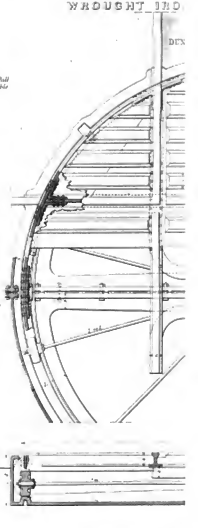
WROUGHT IRON TURNTABLE.

BY P. M. PARSONS, LONDON.



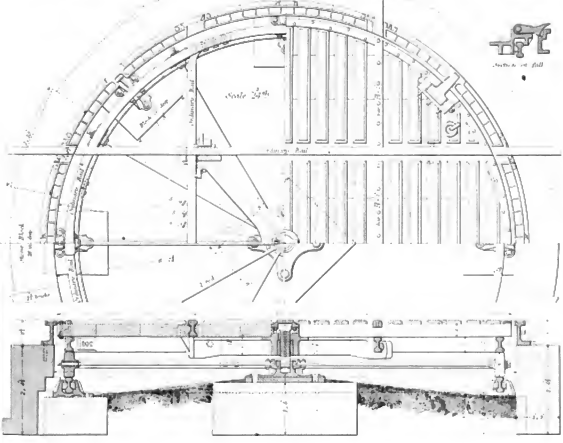
WROUGHT IRO

DES



WROUGHT IRON AND TIMBER TURNTABLE.

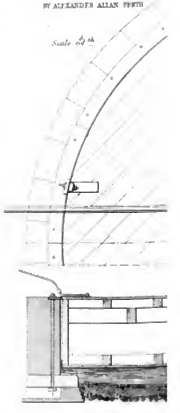
BY EDWARD WOODS, LONDON.



HYDROSTATIC TURNTAB

FOR ENGINE AND TENDER

BY ALEXANDER ALLAN, PERTH.



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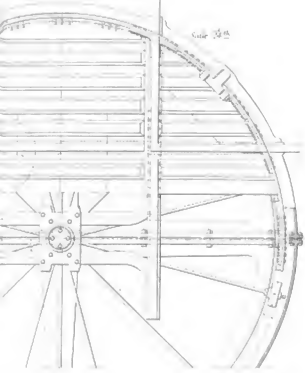
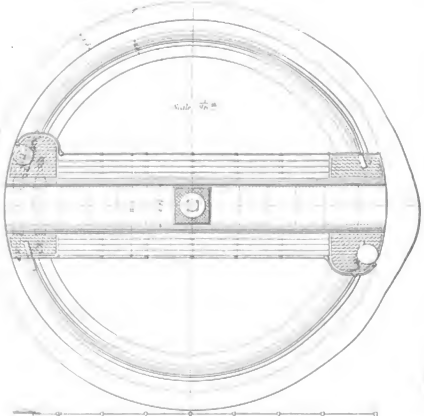
SELF FOUNDATION TURNTABLE.

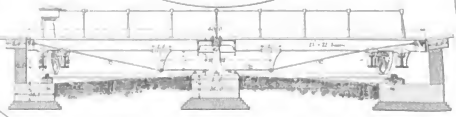
BY EDWARD WOODS LONDON
MADE BY
WATERSLEY & Co MANCHESTER



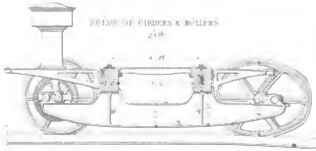
TURNTABLE FOR ENGINE AND TENDER.

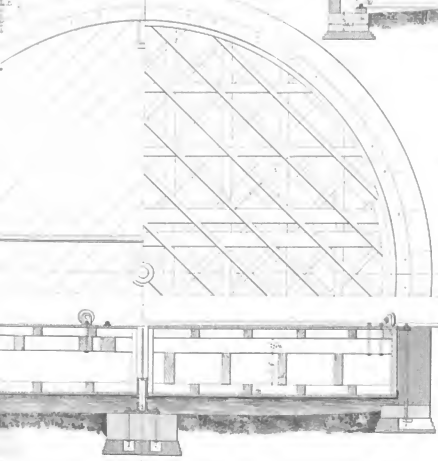
BY LLOYDS FOSTER & Co WEDNESBURY

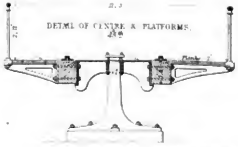




LLOYDS TABLE.







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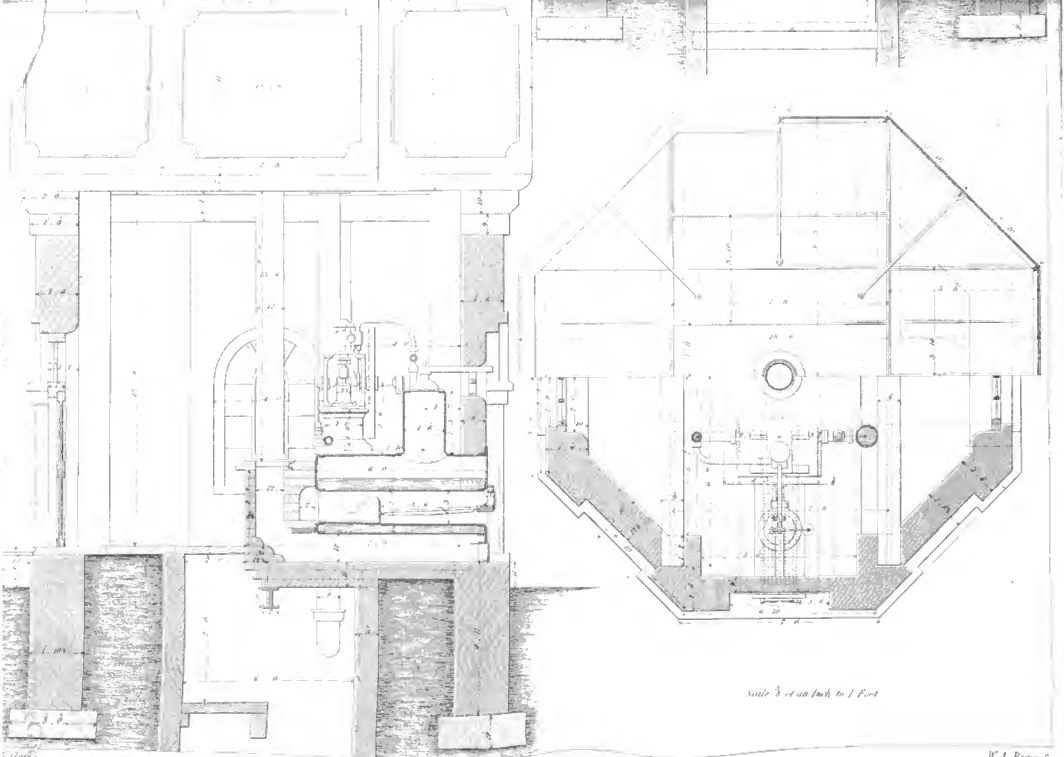
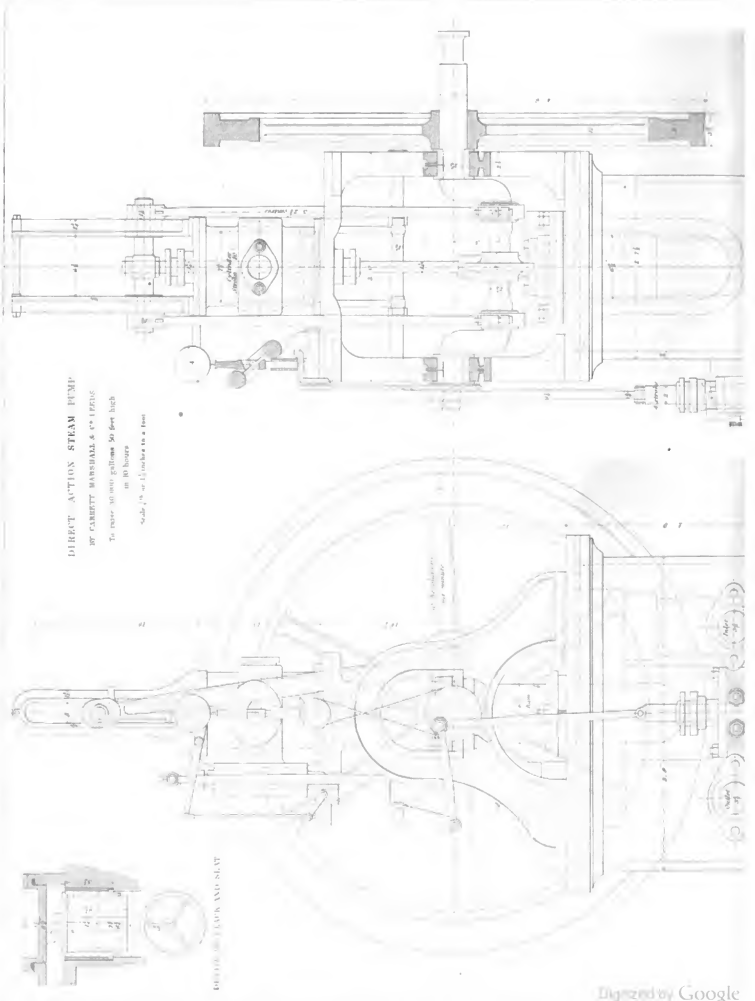


Scale ¼ of an Inch to 1 Foot

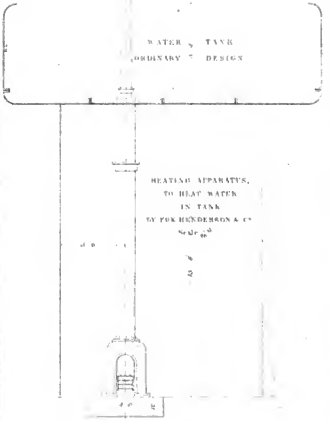
W.A. Brown Sc

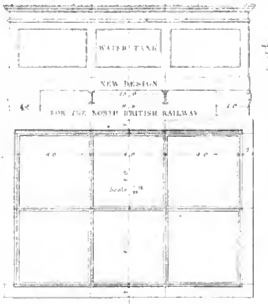
BLACKIE & SON GLASGOW, EDINBURGH & LONDON

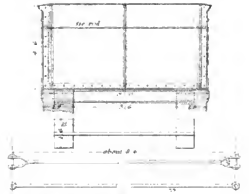
Digitized by Google

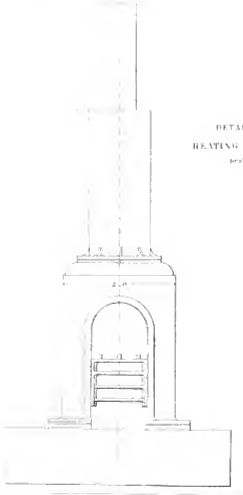

DIRECT ACTION STEAM PUMP
BY GARRETT MARSHALL & Co LEEDS
To raise 10 000 gallons 50 feet high
in 10 hours
Scale 1½ or 12 inches to a foot
DETAILS OF VALVE AND SEAT

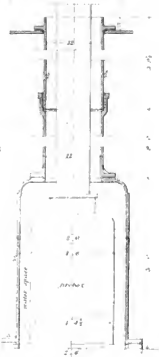
Digitized by Google

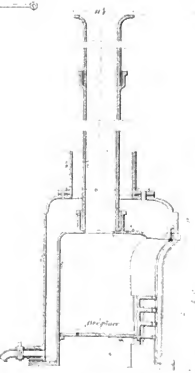


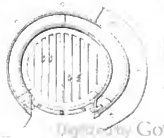












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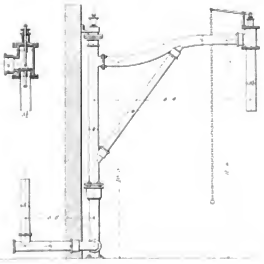
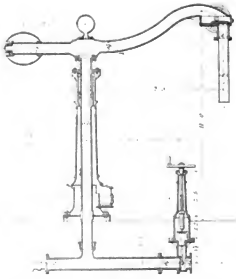
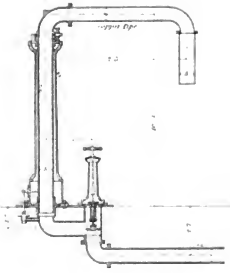
WALL WATER CRANE.



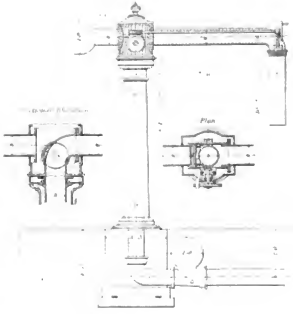
WATER-CRANE
FOR THE NORTH BRITISH RAILWAY.



WATER CRANE
BY RANSOMES & SIMS, IPSWICH.



WATER CRANE.
BY TOM HENDERSON & Co BIRMINGHAM.



Inches 0 1 2 3 4 5 6
Inches 0 1 2 3 6

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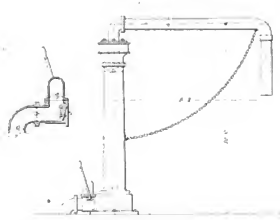
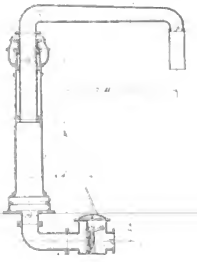
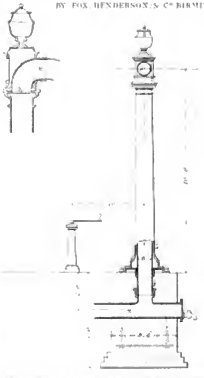
WATER-CRANE
BY S. ELLIS & Co. MANCHESTER



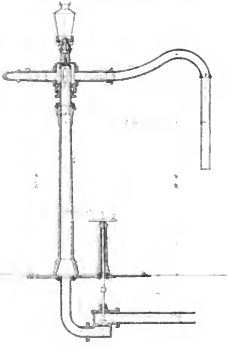
WATER-CRANE
BY S. ELLIS & Co MANCHESTER



WATER-CRANE
BY FOX, HENDERSON & Co BIRMINGHAM



WATER-CRANE USED IN GERMANY



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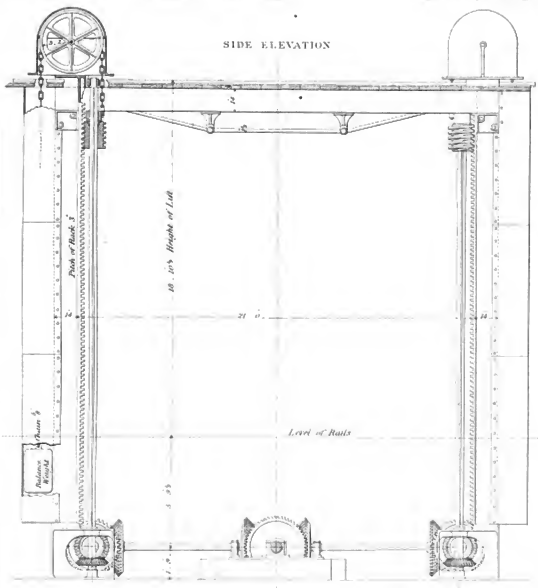
TEN TON WAGGON HOIST, FOR T...

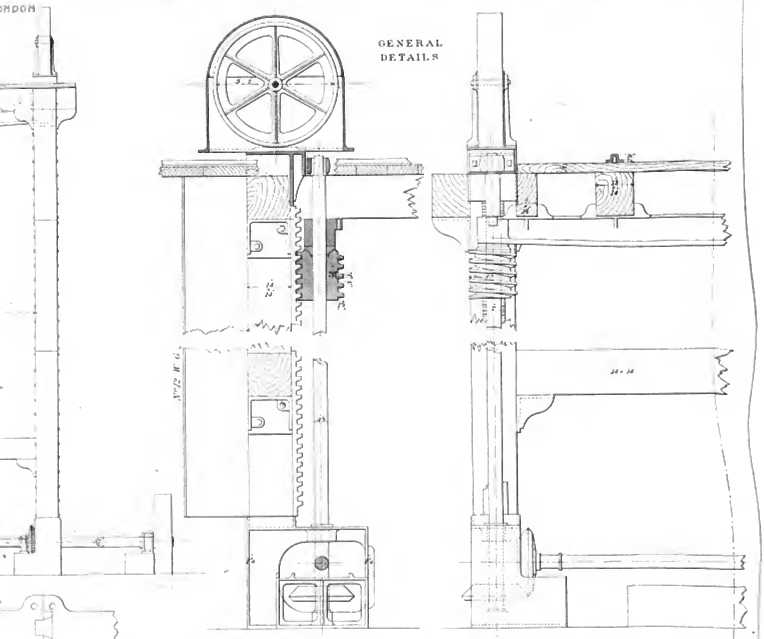
BY PETER ASHCROFT

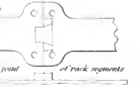

SIDE ELEVATION
END ELEVATION
Pitch of Rack 3"
18. 3½ Height of Lift
21 ft.
Level of Rails
Railway Arcade
Mitre gear at each corner b b b b. 21 in diam.r 2 in pitch 6 in broad
Mitre gear q q 3 feet diam.r teeth 2 in pitch 6 in broad
Spur Wheel
teeth 7 by 2½ pitch
Scale for General Views
Scale for General Detail Views.
Scale for Patterns in Detail

PLAN OF GEARING

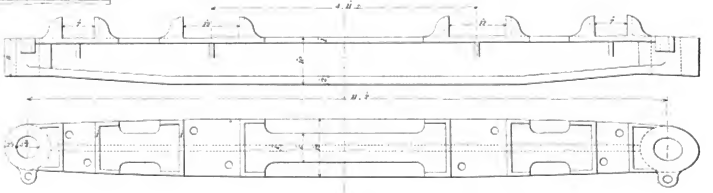
D K Clark

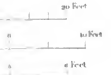
Digitized by Google





PARTICULAR DETAILS.





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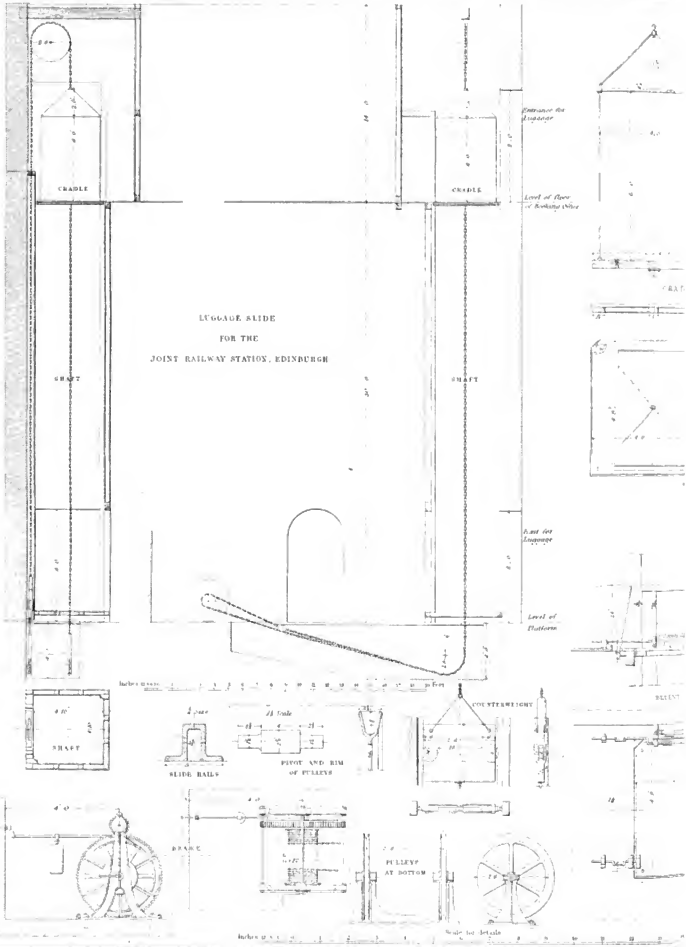

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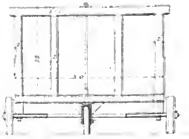
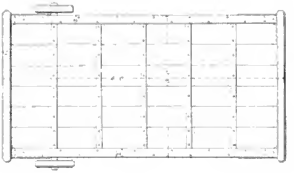
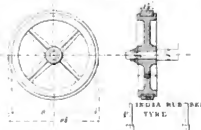
LUGGAGE LORRY, ON PASSENGER PLATFORMS,
FOR THE GREAT NORTHERN RAILWAY.

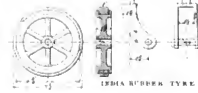






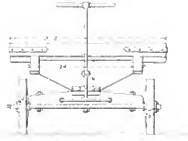
INDIA RUBBER TYRE

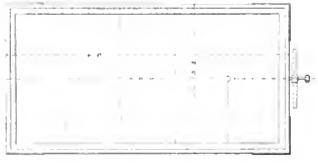
Scale for details
1½ Inches to a foot

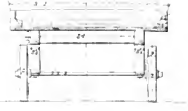


INDIA RUBBER TYRE

LUGGAGE LORRY,
FOR THE LIVERPOOL AND MANCHESTER RAILWAY







Inches 12 0 1 2 3 4 5 6 Feet

PULLEY AT TOP

CRADLE

EDINBURGH & LONDON

J. W. Lowry, sc.
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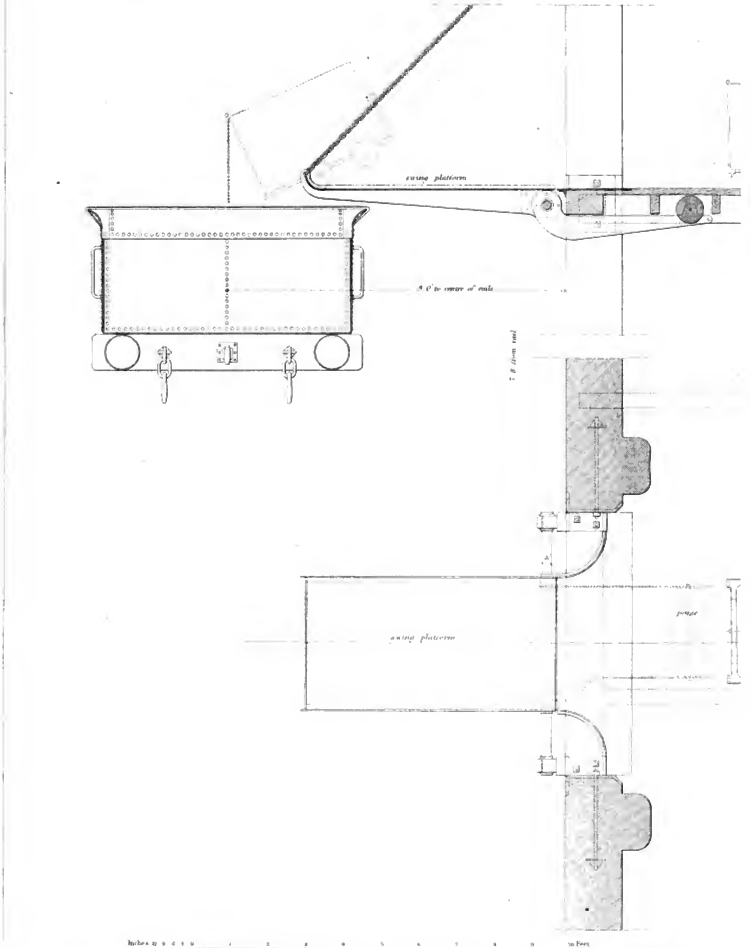

D.K. Clark.

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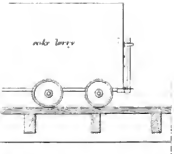
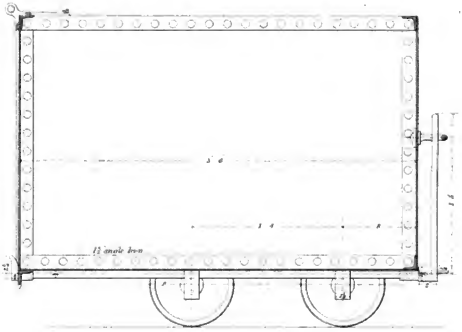
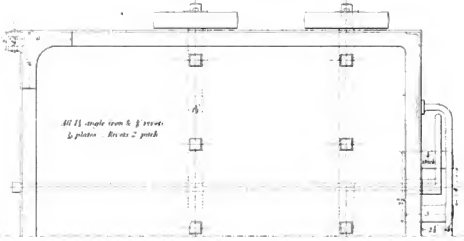
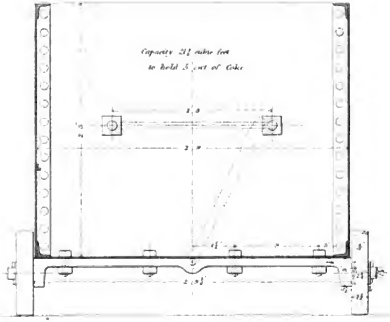




DETAILS OF COKE-LORRY





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PAIR OF SIGNALS FOR THE JUNCTION OF TWO RAILWAYS.

BY J. STEVENS & SONS
LONDON

ORDINARY

FRONT VIEW

Lights. Red and Green

SIDE VIEW

Section at c f

LAMP FOR JUNCTION SIGNAL

APPARATUS FOR ROAD STATION SIGNAL

Section at a b

Section at c d

LAMP PLATFORM
FOR ROAD STATION SIGNAL

FRAME

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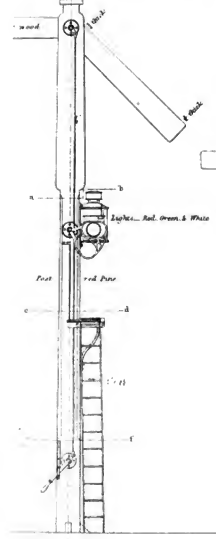
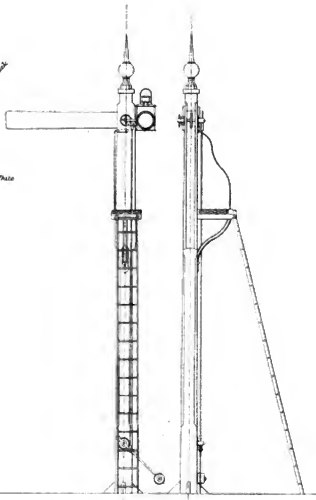
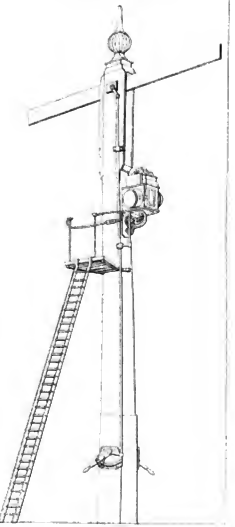
GNAL FOR A ROAD STATION



AUXILIARY OR DISTANT SIGNAL
TO GUARD ROAD-STATIONS.



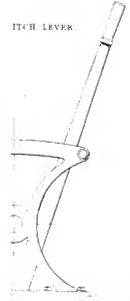
STATION SIGNAL.
(W. CUTT'S PATENT)
BY LINLEY & Co SHEFFIELD.

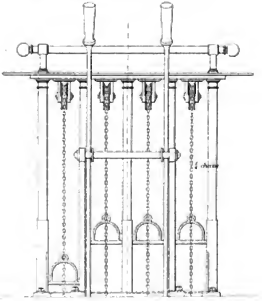


LS.

TREDDLE FRAME FOR JUNCTION SIGNAL.

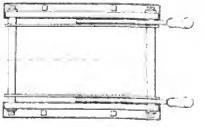
ITCH LEVER.





SIGNAL BOARD

SWITCH LEVERS AT JUNCTION SIGNALS



Scale for Details

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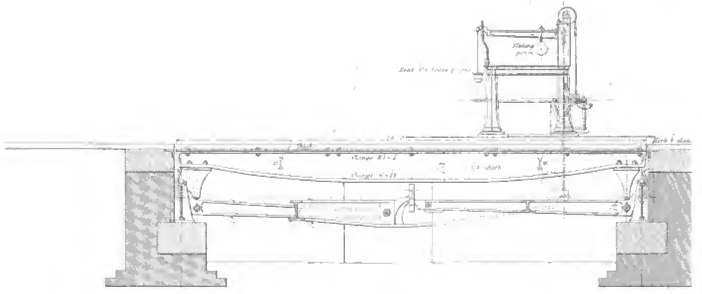
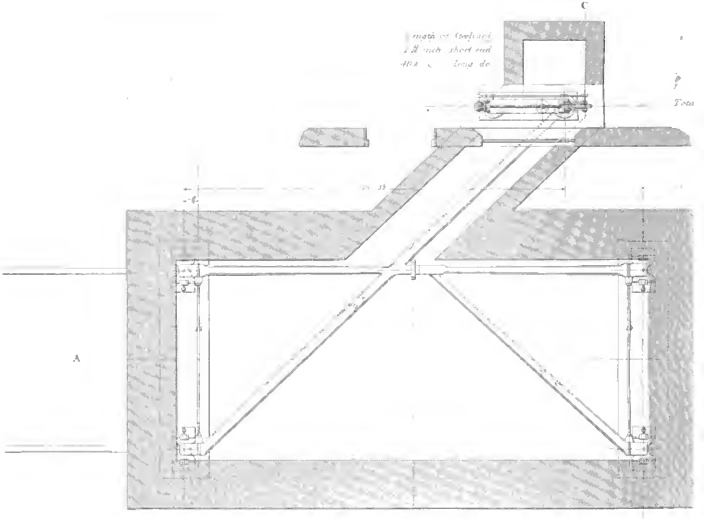
Digitized by Google

Digitized by Google

BY HENRY POOLEY AND SON, (CO
FOR THE GREAT



SECTION THRO A B



PLAN

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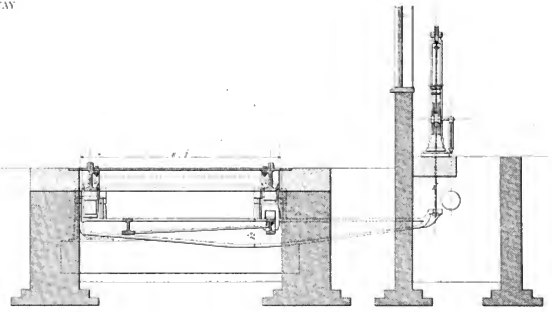
BLACKIE & SON, GLA

BINED PATENTS) LIVERPOOL.
ESTERN RAILWAY

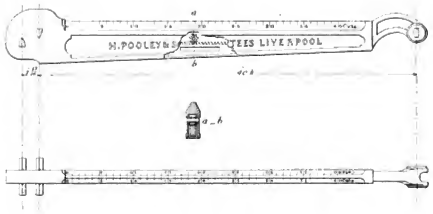


SECTION THRO' C.D

Leverage —
Under levers 1 to 25. 3
Steelyard — 1 to 22. 14
For the loose poises 1 to 300

Scale
0 1 2 3 4 5 6 7 8 9 10 *Feet.*

STEELYARD TO ENLARGED SCALE.



Scale for Details
12 9 6 3 0 1 2
Inches *Feet*

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Fig 2 OLD VALVE — GENERAL DIAGRAM OF THE MOTION OF THE VALVE Scale 3/8

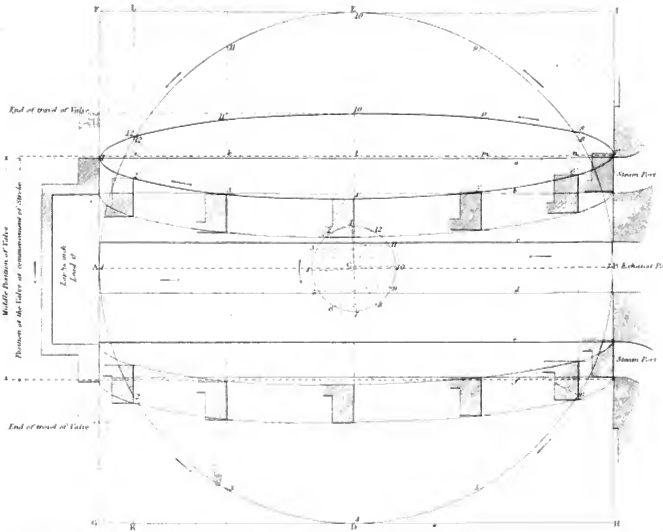
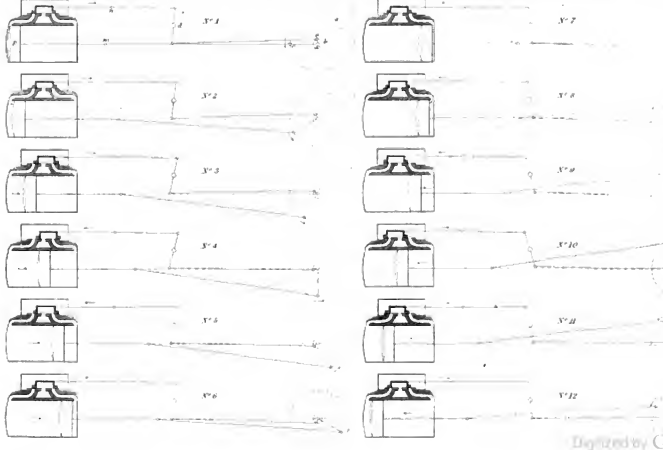

End of travel of Valve
Middle Position of Valve
Position of the Valve at commencement of Stroke
Lap in each End
Steam Port
To Exhaust Pipe
Steam Port
End of travel of Valve

Fig 1 OLD VALVE — DIAGRAMS OF THE POSITIONS OF THE VALVE CORRESPONDING TO TWELVE POSITIONS OF THE PISTON DURING ONE DOUBLE STROKE Scale 3/8



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D.K. Clark

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Fig 1 MODERN VALVE IN FOUR POSITIONS Scale $\frac{1}{24}$

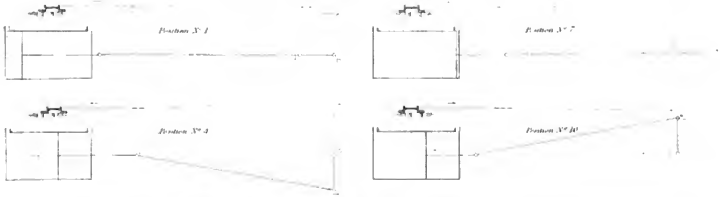
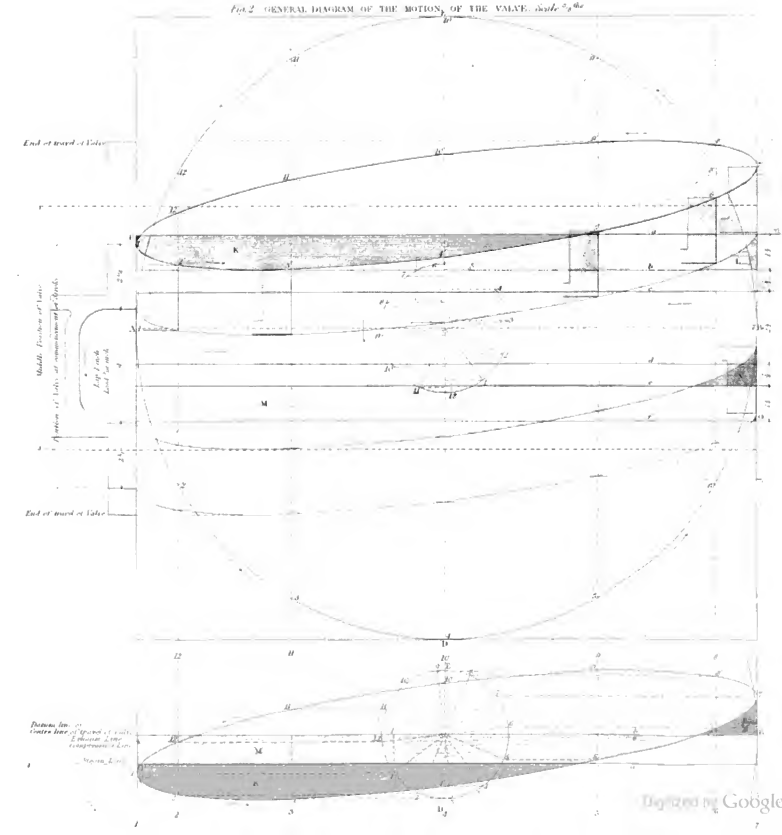


Fig 2 GENERAL DIAGRAM OF THE MOTION OF THE VALVE. Scale $\frac{2}{3}$ the


End of travel of Valve
Middle Position of Valve
Lap of each Edge 1/16 inch
Position of Valve at commencement of Travel
End of travel of Valve
Position line
Centre line of Eccentric
Eccentric Line
Centre line of Crank
Crank Line

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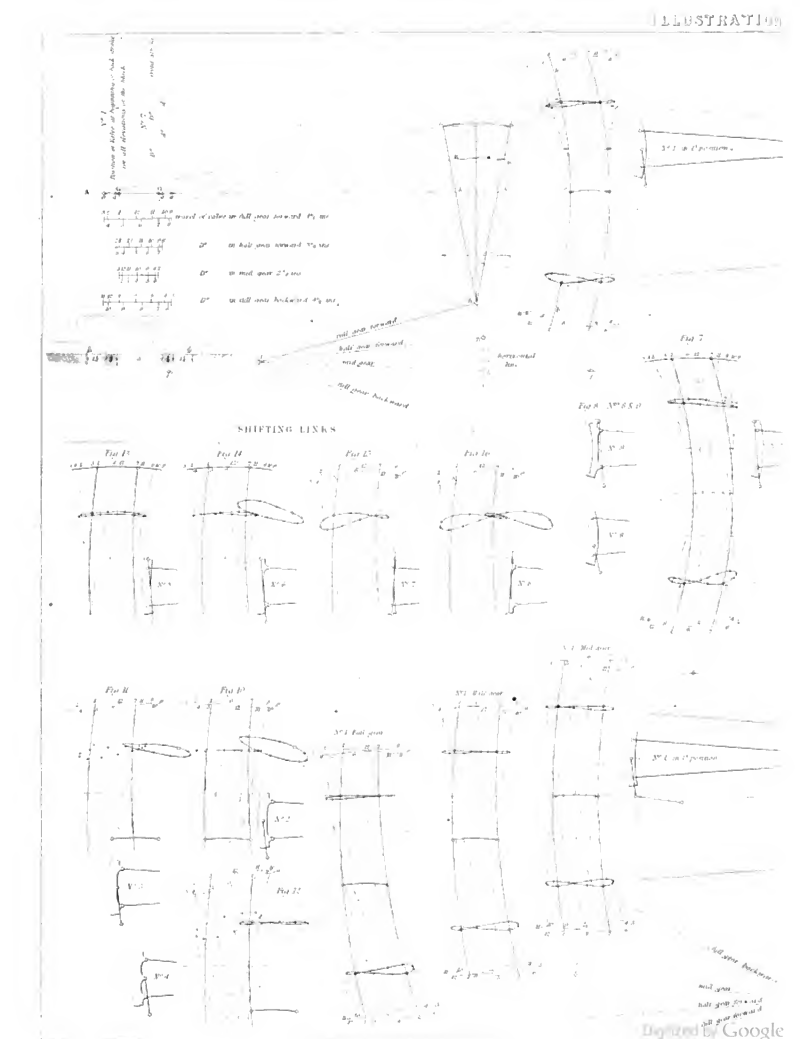

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STATIONARY LINKS

Fig. 1

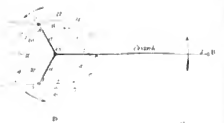


Fig. 6

Fig. 5

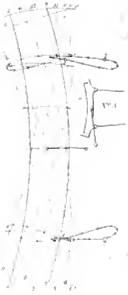


Fig. 4

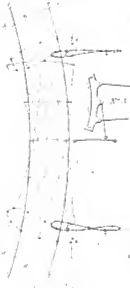


Fig. 3

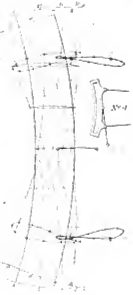
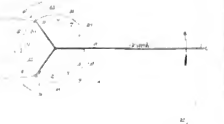


Fig. 2

SHIFTING LINKS

Fig. 10



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First Series

Second Series

Note. Where two diagrams are

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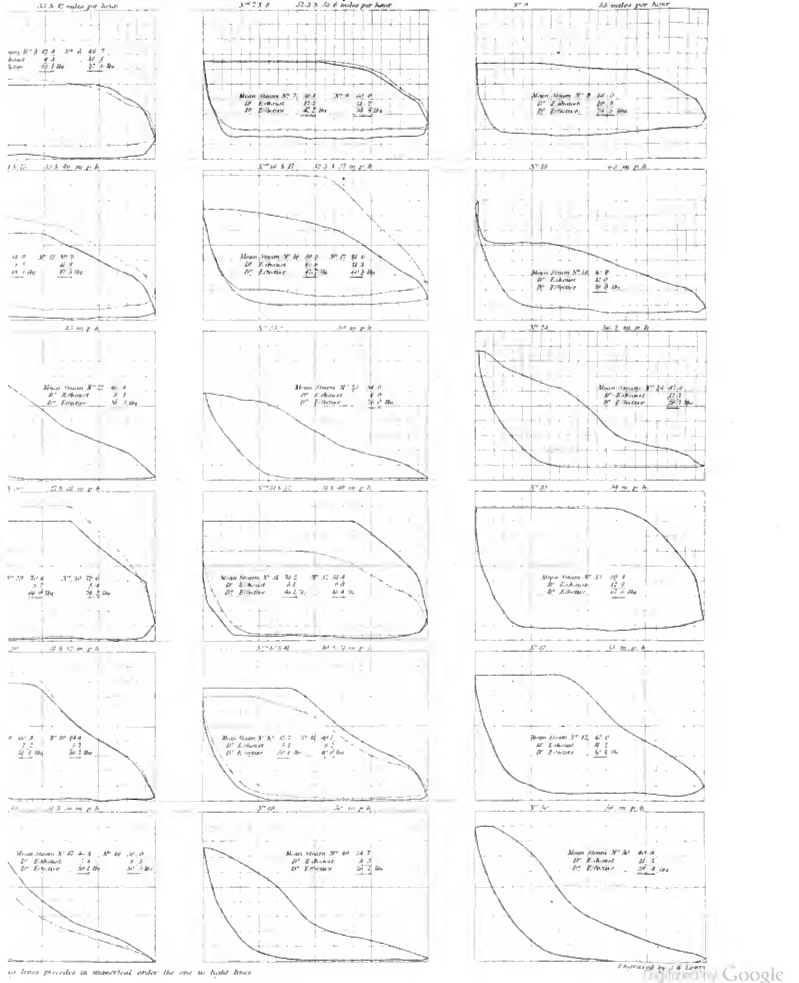
TAIN LOCOMOTIVE, ON THE GREAT WESTERN RAILWAY IN 1847 49 50.

Exhaust port 15 × 3½ Lap & Blast orifice varied

DIAGRAM – PLATE IV



Engraved by J & Lowe

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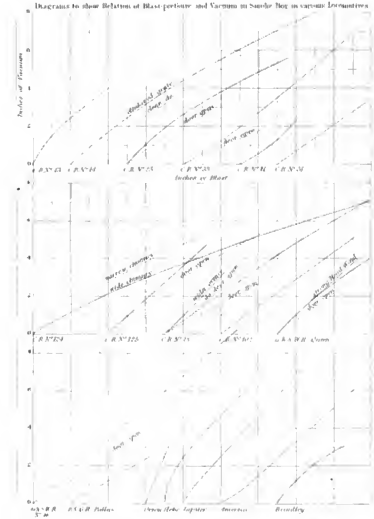
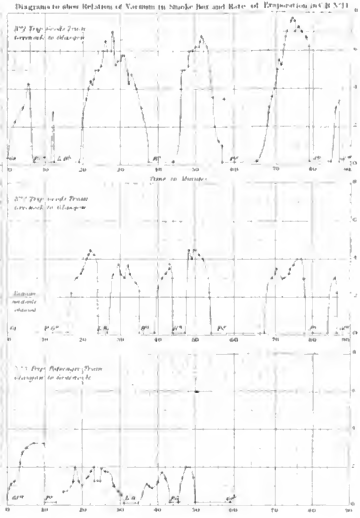
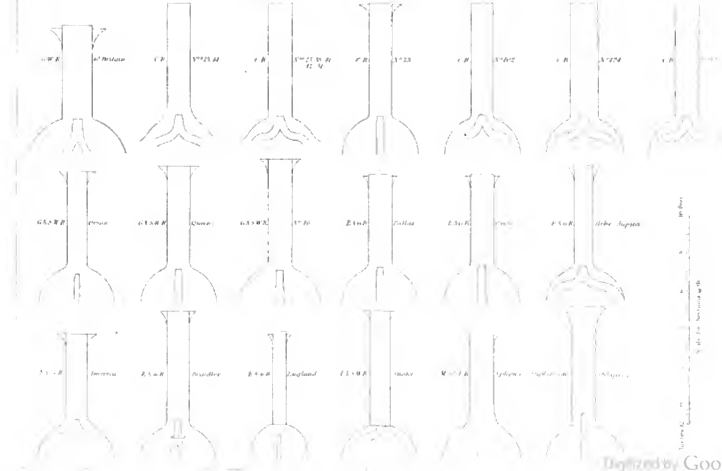
Diagrams to show Relation of Blast-pressure and Vacuum in Smoke Box in various Locomotives



Diagrams to show Relation of Vacuum in Smoke Box and Rate of Evaporation in C.W.T.



Sections of Chimneys and Blast pipes relative to the action of the Blast



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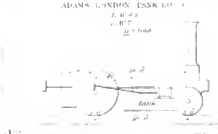
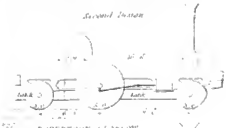
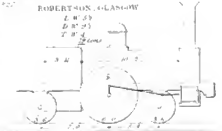
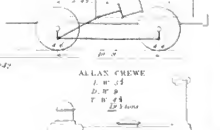
ILLUSTRATIONS OF THE LOCOMOTIVE AS A CARRIAGE, FROM ACTUAL EXAMPLES.

Railway Machinery. PLATE 65. PARTS LOCOMOTIVES WITH OUTSIDE CYLINDERS. Scale 3/8" = 1 foot.









Note. The upright dot-line on the body of each figure, marked 1 on N°1 indicates the position of the centre of gravity and the dotted line marked 2 represents the horizontal distance from the centre of the neighbouring axle. Abbreviations. L W. Leading Wheels. D W. Driving Wheels. T W. Trailing Wheels.

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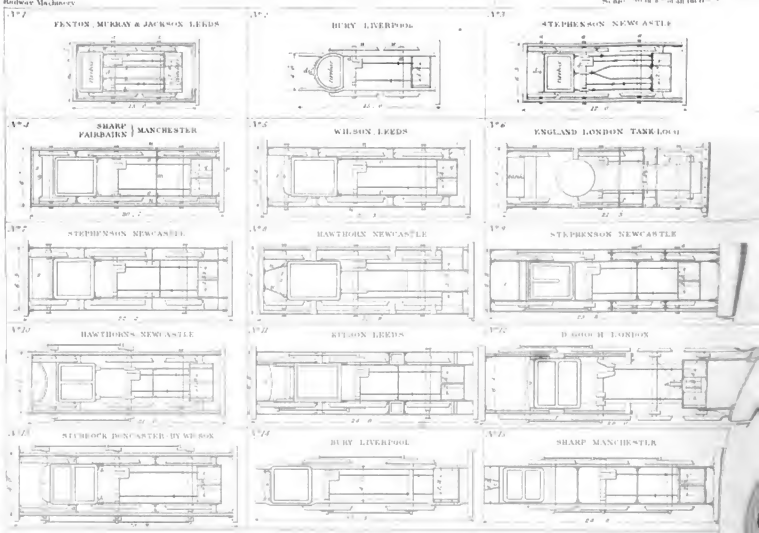
D. K. Clark. W. J. Brown.

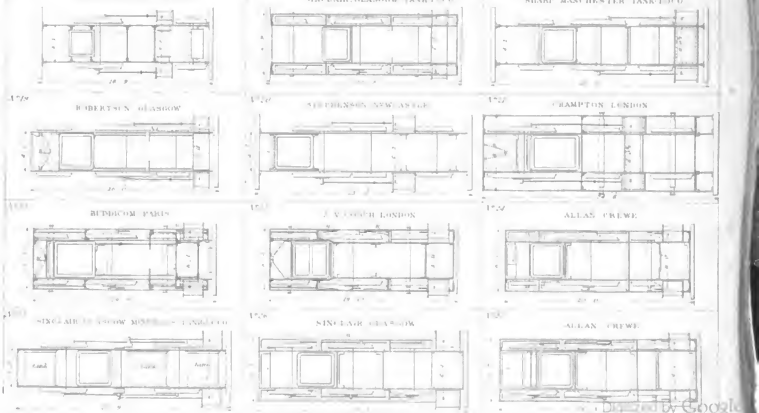
Railway Machinery

PART I. LOCOMOTIVES WITH INSIDE CYLINDERS

Scale 3/8 of an inch = 1 foot



PART II. LOCOMOTIVES WITH OUTSIDE CYLINDERS



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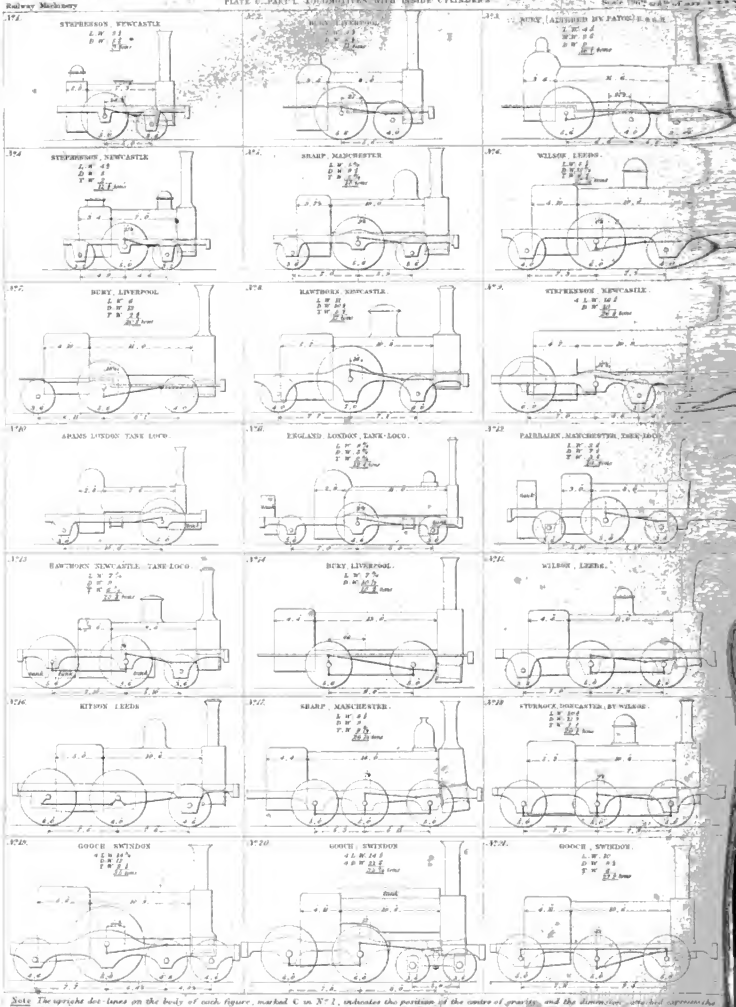

Note. The upright dot-lines on the body of each figure, marked C, in N° 1, indicate the position of the centre of gravity, and the dimension, attached, represents the horizontal distance from the centre of the neighbouring axle. Abbreviations. L.W. Leading Wheels, D.W. Driving Wheels, T.W. Trailing Wheels.

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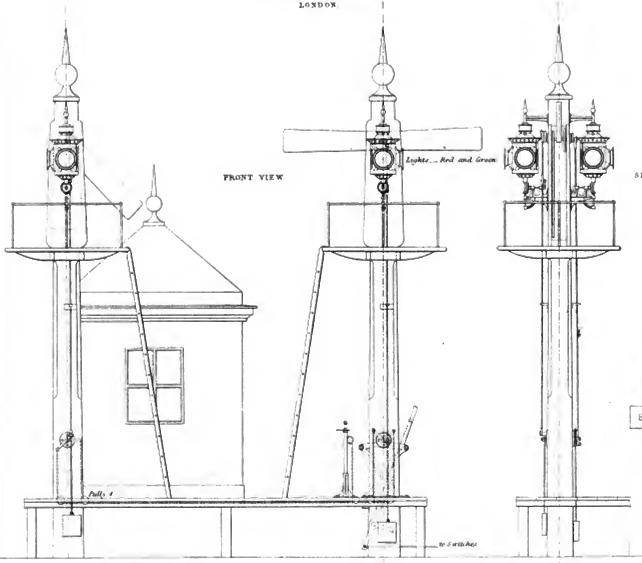
PAIR OF SIGNALS FOR THE JUNCTION OF TWO RAILWAYS.

BY J STEVENS & SONS
LONDON



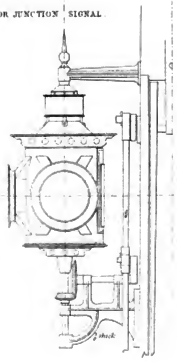
ORDINAR

Semaphore at

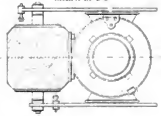
Section at e f

DET

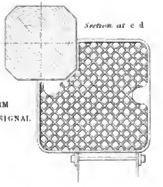
LAMP FOR JUNCTION SIGNAL



APPARATUS FOR ROAD STATION SIGNAL
Section at a b

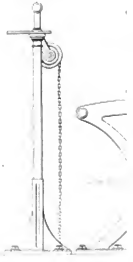


Section at c d



LAMP PLATFORM
FOR ROAD STATION SIGNAL

FRAME



Scale for general views

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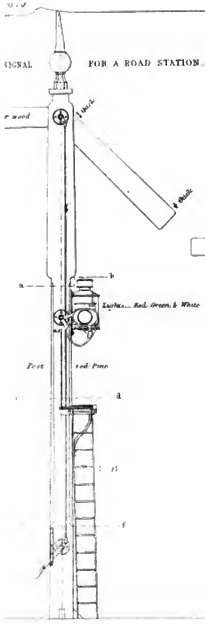
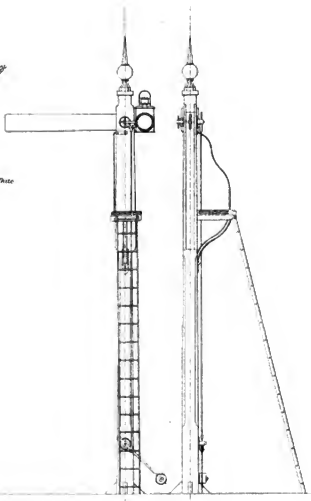
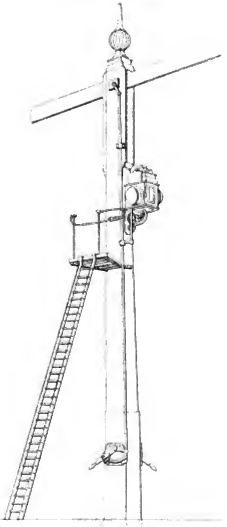
SIGNAL FOR A ROAD STATION.



AUXILIARY OR DISTANT SIGNAL
TO GUARD ROAD-STATIONS.



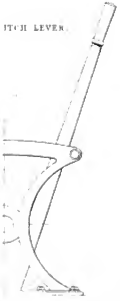
STATION SIGNAL.
(W CUTT'S PATENT)
BY LINLEY & Co SHEFFIELD

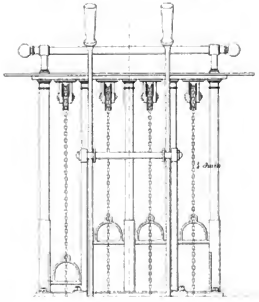


L S.

TREDDLE FRAME FOR JUNCTION SIGNAL

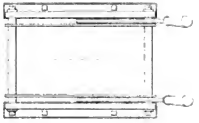
ITCH LEVER.





SIGNAL BOARD

SWITCH LEVERS AT JUNCTION SIGNALS



Scale for details

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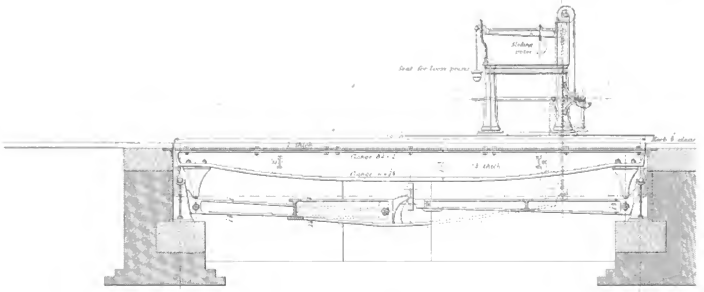
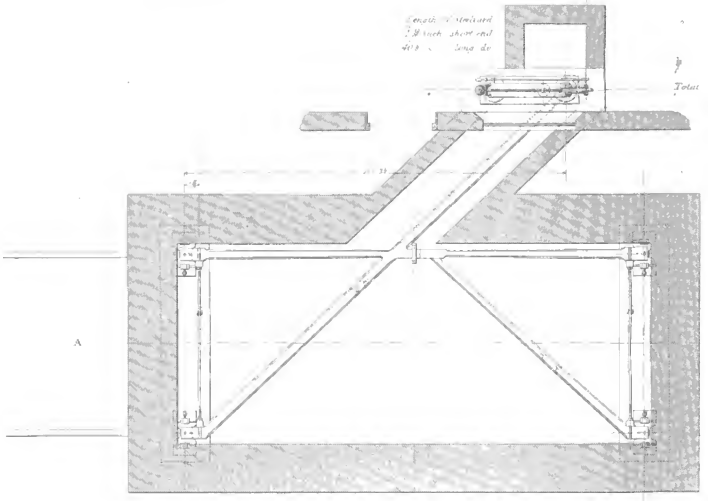
BY HENRY POOLEY AND SON, LCO
FOR THE GREAT



SECTION THRO A B



PLAN

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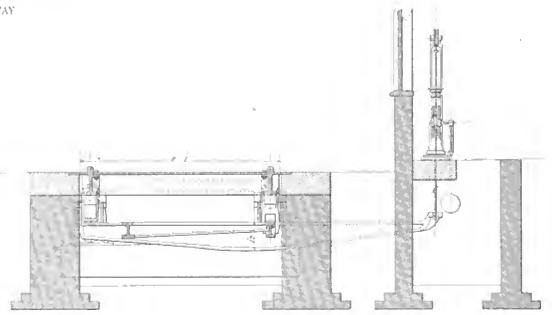
BINED PATENTS) LIVERPOOL.
ESTERN RAILWAY

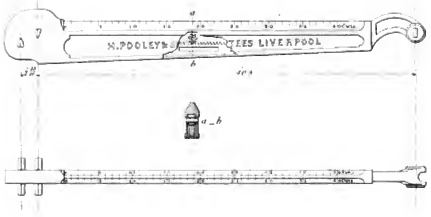


SECTION THRO' C. D

Scale
0 1 2 3 4 5 6 7 8 9 10 Feet

Leverage
Under levers 1 to 28.3
Steelyard 1 to 22.14
For the Iron poises 1 to 560

STEELYARD TO ENLARGED SCALE.



Scale for Details
12 9 6 3 0 1 2
Inches Feet

W. A. Harper

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EDINBURGH & LONDON.

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Fig 2. OLD VALVE — GENERAL DIAGRAM OF THE MOTION OF THE VALVE *Scale ½*

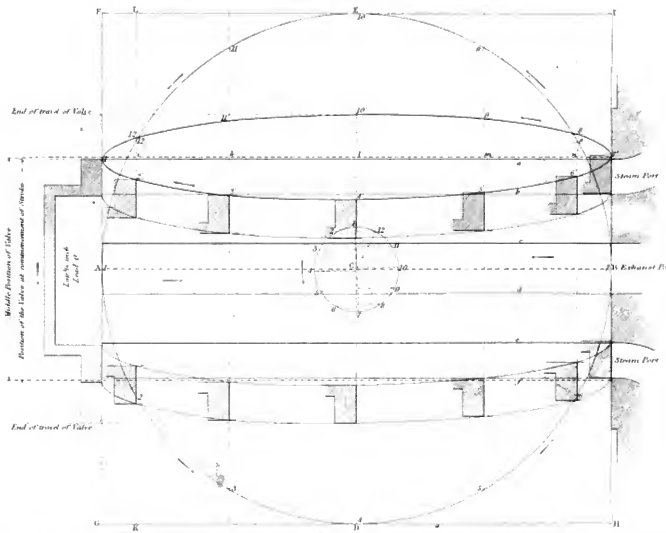
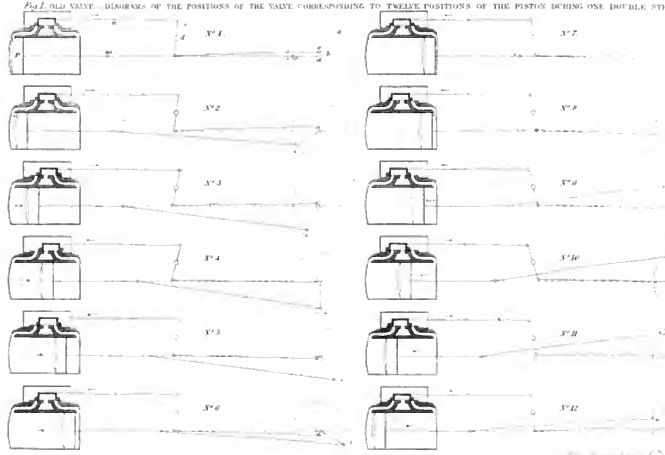


Fig 3. OLD VALVE — DIAGRAMS OF THE POSITIONS OF THE VALVE CORRESPONDING TO TWELVE POSITIONS OF THE PISTON DURING ONE DOUBLE STROKE *Scale ½*



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D K Clark

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Fig 1. MODERN VALVE IN FOUR POSITIONS Scale $\frac{1}{24}$

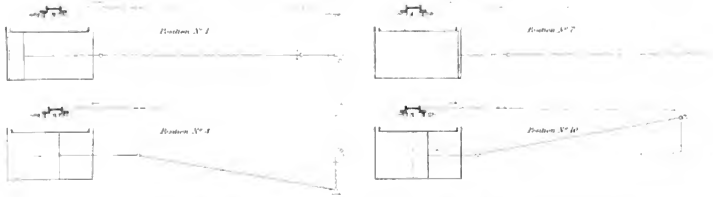
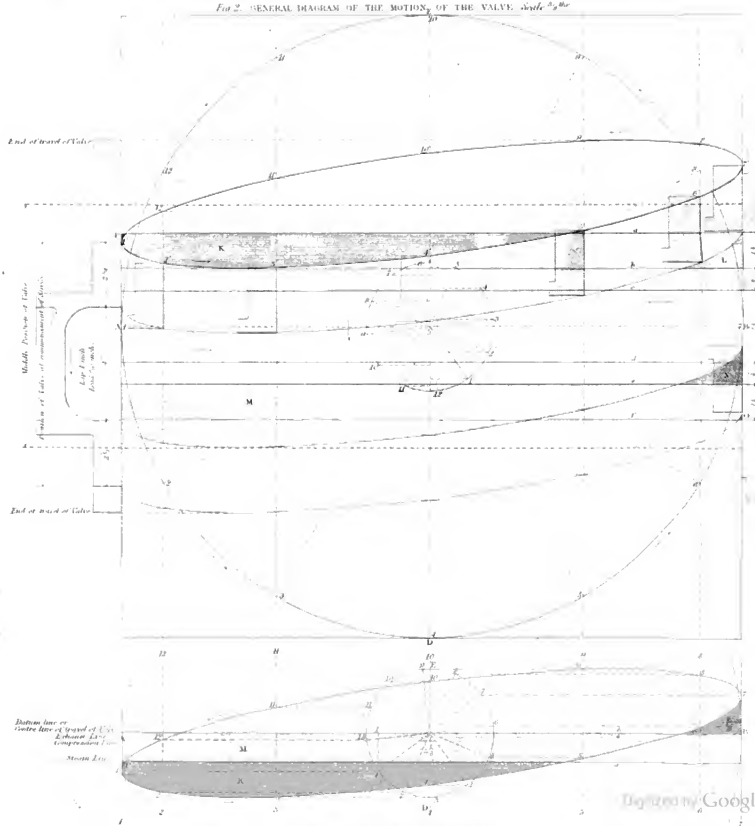


Fig 2. GENERAL DIAGRAM OF THE MOTION OF THE VALVE Scale $\frac{3}{8}$ths


End of travel of Valve
Middle Position of Valve
Edge of each Steam Port
Width of Valve at commencement of Exhaust
End of travel of Valve
Bottom line or Centre line of Travel of Valve
Exhaust Line
Compression Line
Steam Line

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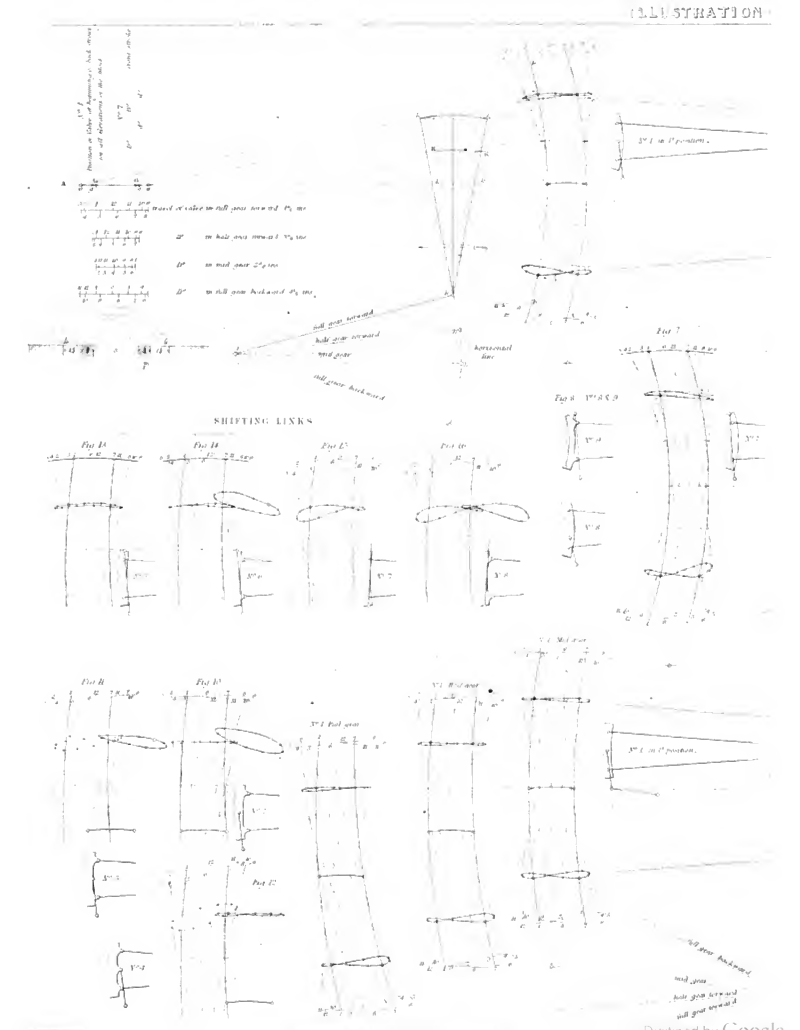
SHIFTING LINKS
Fig 1A
Fig 1B
Fig 1C
Fig 1D
Fig 7
Fig 8
Fig 11
Fig 12
Fig 13
Fig 14
Fig 15
Fig 16
Fig 17
Fig 18
Fig 19
Fig 20
Fig 21
Fig 22
Fig 23
Fig 24
Fig 25
Fig 26
Fig 27
Fig 28
Fig 29
Fig 30
Fig

STATIONARY LINKS

Fig 1

SHIFTING LINKS

Fig 11.

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INDICATOR DIAGRAMS TAKEN FROM THE CYLINDER OF THE GREAT BR

Cylinder 18 × 24 Wheel 8 feet Steam ports 1

First Series

Outside Cyl. 1 inch. Inside Cyl. ¾ inch. Boost in Front 4½ except No. 3 17 lbs. ¾"

N°2 Notch

Travel of Valve 4½
Port opens 1¼
Suppression 17/16
Release 2⅛
Compression 2⅝

Mean Steam N°2 .42 .6 N° 5 N° 8
P° Exhaust 11 6 5
P° Entering 49 67 lbs 9 15 lbs

N°3 Notch

Travel of Valve 3½
Port opens ⅞
Suppression 1¼
Release 2⅛
Compression 2⅝

Mean Steam N° .81 .4 1 N° 11 N° 5
P° Exhaust 4 3 3 4
P° Entering 41 ½ lbs 46 ½ lbs

N°5 Notch

Travel of Valve 2¾
Port opens ⅝
Suppression 1⅝
Release 2⅛
Compression 2

Mean Steam N° .81 .44 1 N° 15 N° 7
P° Exhaust 4 3 4 3
P° Entering 37 ½ lbs 46 ½ lbs

N°1 Notch

Travel of Valve 4½
Port opens 1⅜
Suppression 1⅝
Release 2¼
Compression 3

Mean Steam N° .15 .65 .8 N° 7 N° 6
P° Exhaust 4 4 4
P° Entering 36 ½ lbs 39 ½ lbs

Second Series

Outside Cyl. 1¼ Inside Cyl. 1¼ Boost in front 4½ Boost in Front 17 lbs. ¾"

N°4 Notch

Travel of Valve 3½
Port opens ¾
Suppression 1⅜
Release 2⅛
Compression 2⅝

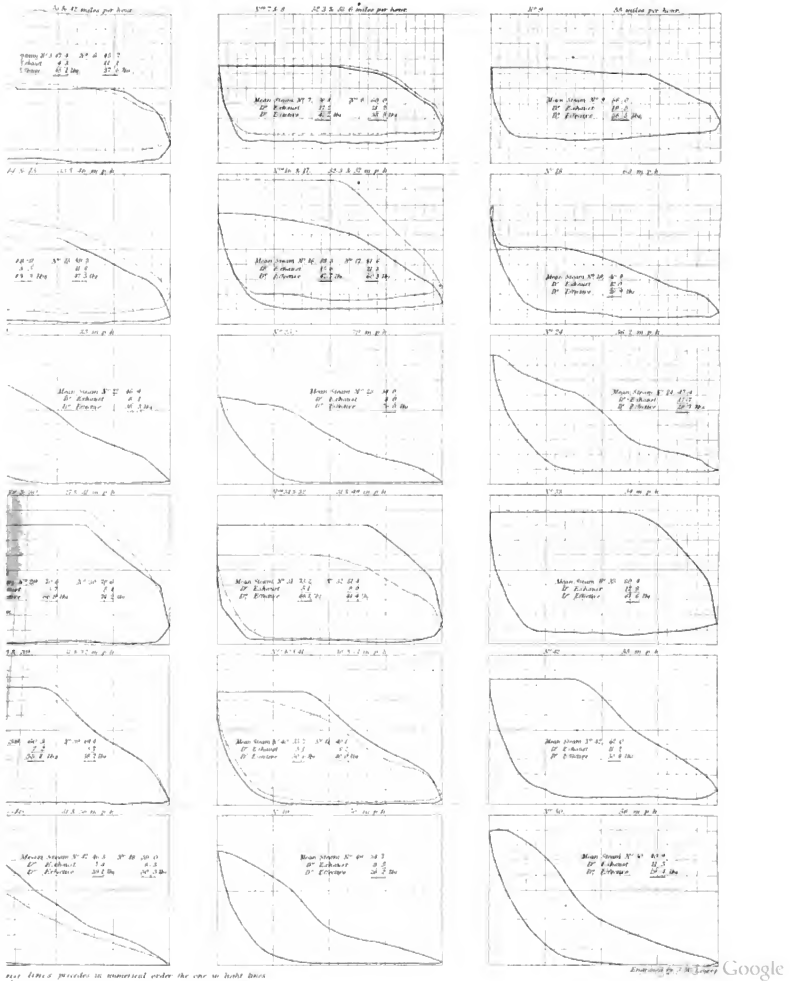
Mean Steam N° .83 .5 .4 N° 10 N° 6
P° Exhaust 3 4 4
P° Entering 39 ½ lbs 46 ½ lbs

N°6 Notch

Travel of Valve 3½
Port Opens ⅝
Suppression 1⅜
Release 2⅞
Compression 2⅝

Mean Steam N° .83 .5 .4 N° 8 N° 6
P° Exhaust 4 4 4
P° Entering 39 ½ lbs 43 ½ lbs

Note. Where two diagrams are taken on the same [illegible]



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Diagrams to show Relation of Blast pressure and Vacuum in Smoke Box in various Locomotives

Diagrams to show Variation of Vacuum in Smoke Box and Rate of Evaporation in lbs

Inches of Vacuum

Inches of Blast

Time in Minutes

Sections of Chimneys and Blast pipes, relative to the action of the Blast

Inches of Vacuum

Inches of Blast

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ILLUSTRATIONS OF THE LOCOMOTIVE AS A CARRIAGE, FROM ACTUAL EXAMPLES.

Railway Machinery — PLATE V. PART 2. LOCOMOTIVES WITH OUTSIDE CYLINDERS. — Scale: Inch = 8 Feet

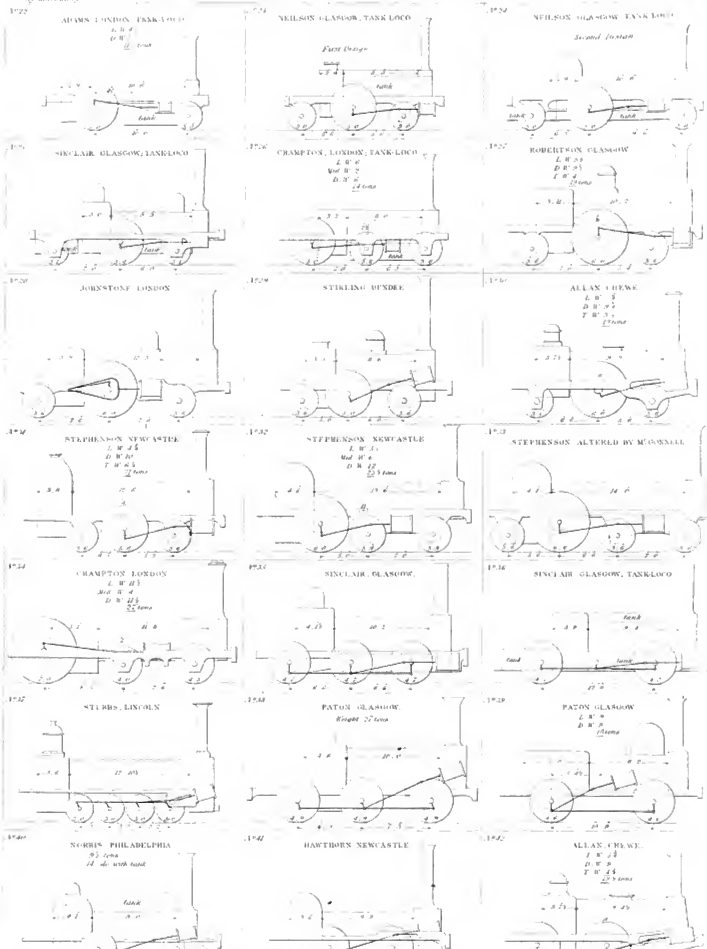
Fig. 22 ADAMS LONDON TANK LOCO
Fig. 23 NEILSON GLASGOW, TANK LOCO
Fig. 24 NEILSON GLASGOW TANK LOCO
Second Version
Fig. 25 SINCLAIR GLASGOW, TANK LOCO
Fig. 26 CRAMPTON, LONDON, TANK LOCO
Fig. 27 ROBERTSON GLASGOW
Fig. 28 JOHNSTONE LONDON
Fig. 29 STIRLING DUNDEE
Fig. 30 ALLAN CREWE
Fig. 31 STEPHENSON NEWCASTLE
Fig. 32 STEPHENSON NEWCASTLE
Fig. 33 STEPHENSON ALTERED BY McCONNELL
Fig. 34 CRAMPTON LONDON
Fig. 35 SINCLAIR GLASGOW.
Fig. 36 SINCLAIR GLASGOW, TANK LOCO
Fig. 37 STUBBS, LINCOLN
Fig. 38 PATON GLASGOW
Fig. 39 PATON GLASGOW
Fig. 40 NORRIS PHILADELPHIA
Fig. 41 HAWTHORN NEWCASTLE
Fig. 42 ALLAN CREWE

Note. The upright dot-line on the body of each figure marked 1 in N°1 indicates the position of the centre in quarters and the dimensions attached represent the horizontal distance from the centre of the neighbouring axle. Abbreviations. L W Leading Wheels. D W Driving Wheels. T W Trailing Wheels.

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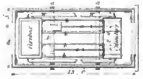
ILLUSTRATIONS OF LOCOMOTIVE FRAMING, FROM ACTUAL EXAMPLES.

Railway Machinery

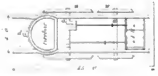
Scale 3/16 of an inch to a foot

PART I. LOCOMOTIVES WITH INSIDE CYLINDERS.

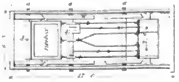
No 1 FENTON, MURRAY & JACKSON, LEEDS



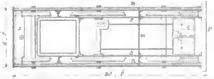
No 2 BURY, LIVERPOOL



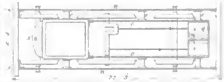
No 3 STEPHENSON, NEWCASTLE



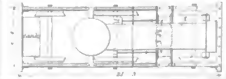
No 4 SHARP, MANCHESTER / FAIRBAIRN



No 5 WILSON, LEEDS



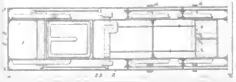
No 6 ENGLAND, LONDON, TANK LOCO



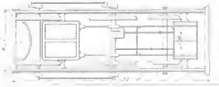
No 7 STEPHENSON, NEWCASTLE

No 8 HAWTHORN, NEWCASTLE

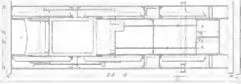
No 9 STEPHENSON, NEWCASTLE



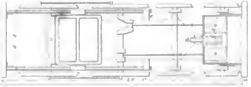
No 10 HAWTHORN, NEWCASTLE



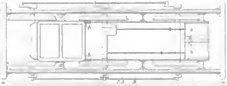
No 11 KITSON, LEEDS



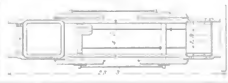
No 12 P. GOOCH, LONDON



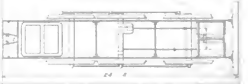
No 13 STURROCK, DONCASTER, BY WILSON



No 14 BURY, LIVERPOOL

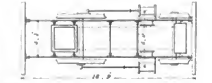


No 15 SHARP, MANCHESTER

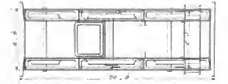


PART II. LOCOMOTIVES WITH OUTSIDE CYLINDERS.

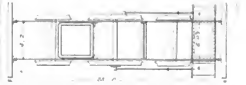
No 16 ADAMS, LONDON, TANK-LOCO



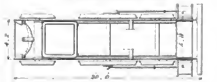
No 17 SINCLAIR, GLASGOW, TANK-LOCO



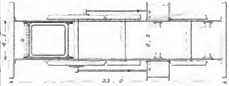
No 18 SHARP, MANCHESTER, TANK-LOCO



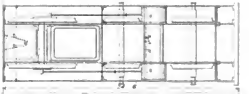
No 19 ROBERTSON, GLASGOW



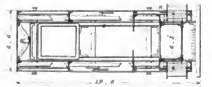
No 20 STEPHENSON, NEWCASTLE.



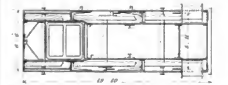
No 21 CRAMPTON, LONDON



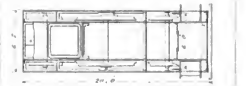
No 22 BUDDICOM, PARIS



No 23 J. V. GOOCH, LONDON

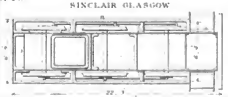


No 24 ALLAN, CREWE



No 25 SINCLAIR, GLASGOW, MINERALS, TANK-LOCO

No 26 SINCLAIR, GLASGOW



No 27 ALLAN, CREWE

D. K. Clark

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Railway Machinery. PLATE I. PART I. LOCOMOTIVES WITH INSIDE CYLINDERS. Scale 1/8th or 1/4th of an inch to 1 foot.

Note. The upright dot-lines on the body of each figure, marked C in N° 1, indicate the position of the centre of gravity, and the dimension attached expresses the horizontal distance from the centre of the neighbouring axle. Abbreviations. L W Leading Wheels. D W Driving Wheels. T W Trailing Wheels.

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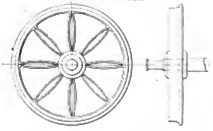
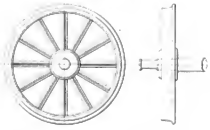
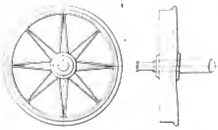
LUSH & BELL



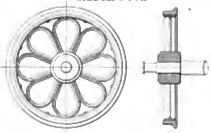
HAWKES



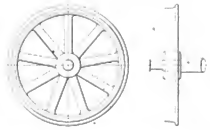
HAGUE



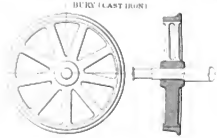
BRAMAH & FOX



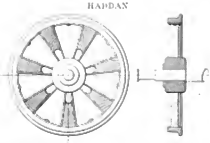
CAST IRON WHEEL



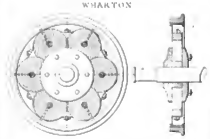
BURY (CAST IRON)



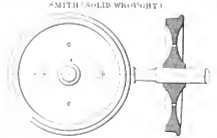
HAPDAN



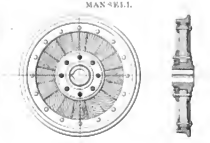
WHARTON



SMITH (SOLID WROUGHT)

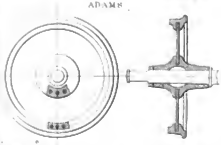


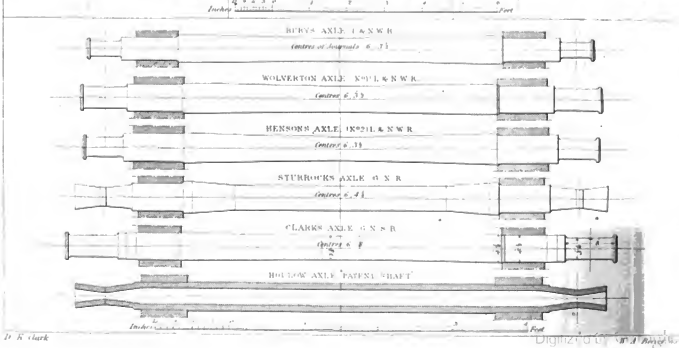
MANSELL



ADAMS

ADAMS




BURYS AXLE L & N W R
Centres of Journals 6' 3"
WOLVERTON AXLE N°1 L & N W R.
Centres 6' 3"
HENSONS AXLE (N°2) L & N W R.
Centres 6' 3"
STURROCKS AXLE G N R
Centres 6' 4"
CLARKS AXLE G N R
Centres 6' 8"
HOLLOW AXLE PATENT SHAFT
Inches
Feet

T. K. Clark

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1 PRIMITIVE AXLEBOX

2 COMMON AXLEBOX

3 [illegible]

4 FRENCH AXLEBOX

5 [illegible]

6 [illegible]

7 [illegible]

8 [illegible]

9 [illegible]

10 [illegible]

11 [illegible]

12 [illegible]

13 [illegible]

14 [illegible]

15 [illegible]

16 ALLAN

17 HODGE

18 W. A. ADAMS

inches 0 1 2 3 4 feet

H. K. Clark W. A. Brewer sc.

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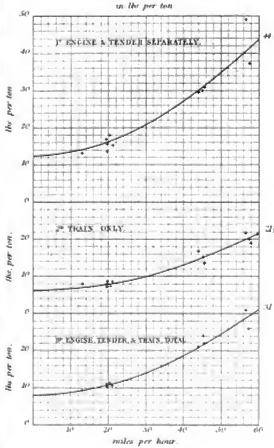
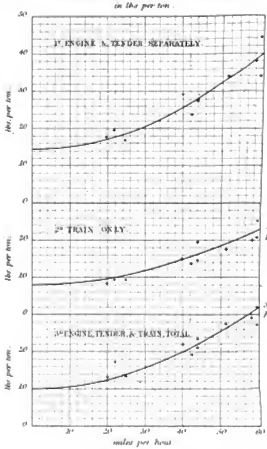
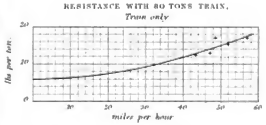
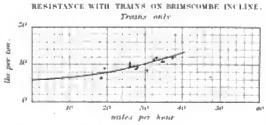
DIAGRAMS OF TRAIN-RESISTANCES,

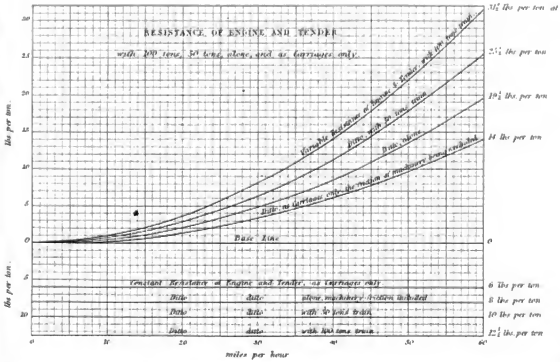
Deduced from Mr D. Gooch's Experiments.


RESISTANCES WITH 100 TONS TRAIN,
in lbs per ton
1st ENGINE & TENDER SEPARATELY.
44 lbs per ton.
2nd TRAIN ONLY.
3¼ lbs per ton
4 lbs per ton.
3rd ENGINE, TENDER, & TRAIN, TOTAL.
lbs per ton.
miles per hour.


RESISTANCES WITH 50 TONS TRAIN.
in lbs per ton.
1st ENGINE & TENDER SEPARATELY.
40 lbs per ton.
2nd TRAIN ONLY.
2.3 lbs per ton
3.2 lbs per ton.
3rd ENGINE, TENDER, & TRAIN, TOTAL.
lbs per ton.
miles per hour






RESISTANCE OF ENGINE AND TENDER
with 200 tons, 50 tons, plows, and ac. Carriages only.
11½ lbs per ton at 60 miles per hour
7½ lbs per ton
10½ lbs per ton
14 lbs per ton
Base Line
Resistance of Engine and Tender, as Carriages only
6 lbs per ton.
8 lbs per ton
10 lbs per ton
12½ lbs per ton
lbs per ton.
miles per hour

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